ADDENDUM NO. 2

May 20, 2011

TO

PROJECT MANUAL

FOR

WATER TREATMENT PLANT

FOR

CITY OF FAIRMONT

FAIRMONT, MINNESOTA

APRIL 2011

The following changes, additions, and deletions are hereby made a part of the Bidding Documents for the ***Water Treatment Plant*** project as fully and completely as if the same were set forth therein. Acknowledge receipt of this addendum in the space provided on the Bid Form and also on the outside of the Bid envelope. **FAILURE TO DO SO MAY RESULT IN REJECTION OF BID.**

This addendum consists of eighteen (18) pages and twenty-four (24) attachments.

CHANGES TO SPECIFICATIONS

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

Page 00 21 13-8. Paragraph 15.03.A, **Delete** in its entirety and replace with the following:

A. Enclose in an opaque sealed envelope:

1. Completed Bid Form (See Section 00 41 00).
2. Bid Security (See Section 00 43 13).
3. Bidder Qualifications Form (See Section 00 45 13).
4. Electrical and Mechanical Subcontractor Qualifications Forms (See Section 00 45 14).
5. A copy of the form letter used by Contractor to solicit DBE businesses for this Project."
6. EPA Form 6100-3, DBE Subcontractor Performance Form (See Section 00 73 40).
7. EPA Form 6100-4, DBE Subcontractor Utilization Form (See Section 00 73 40).
8. Non-Collusion Affidavit (See Section 00 45 19).

9. Department of Human Rights Certificate of Compliance (See Section 00 45 36).
10. Governmental Certifications (See Section 00 45 46).

SECTION 00 41 00 – BID FORM

1. Page 00 41 00-4. Paragraph 5.01, after Alternate 4 **Add** the following:

Alternate 5 – Alternate Control Systems Manufacturer:
(for replacing Base Bid Control Systems Manufacturer with Alternate Control Systems Manufacturer as defined in Section 01 11 00 – Summary of Work and Section 40 91 10 – Control Panels)

DEDUCT $_____

(use figures)

2. Page 00 41 00-4. Paragraph 7.01, **Delete** in its entirety and replace with the following:

7.01 The following documents are attached to and made a condition of this Bid:

A. Completed Bid Form (See Section 00 41 00).
B. Bid Security (See Section 00 43 13).
C. Bidder Qualifications Form (See Section 00 45 13).
D. Electrical and Mechanical Subcontractor Qualifications Forms (See Section 00 45 14).
E. A copy of the form letter used by Contractor to solicit DBE businesses for this Project.
F. EPA Form 6100-3, DBE Subcontractor Performance Form (See Section 00 73 40).
G. EPA Form 6100-4, DBE Subcontractor Utilization Form (See Section 00 73 40).
H. Non-Collusion Affidavit (See Section 00 45 19).
I. Department of Human Rights Certificate of Compliance (See Section 00 45 36).
J. Governmental Certifications (See Section 00 45 46).

SECTION 00 45 14 – SUBCONTRACTORS QUALIFICATIONS FORM

1. Pages 00 41 00-1 through 00 41 00-4. **Delete** Subcontractors Qualifications Forms in their entirety and **Replace** with the attached Subcontractors Qualifications Forms dated 052011.

SECTION 00 73 23 – AGENCY AGREEMENT

1. Page 00 73 23 – 1. **Add** the following items to the fifth paragraph:

8. Equipment and items purchased by the Contractor for the Owner under this Agency Agreement shall be paid as Stored Materials. Refer to Paragraph 6.02.A.1.b of Section 00 52 00 – Agreement.

9. Contractor must maintain the appropriate property insurance for all equipment and items purchased by the Contractor for the Owner under this Agency Agreement. Refer to Paragraph 14.02.A.1 of Section 00 72 00 – General Conditions, Page 00700-36.

SECTION 01 11 00 – SUMMARY OF WORK

1. Page 00 11 00-4. After Paragraph 1.02.B.5, **Add** Paragraph 1.02.B.6 as follows:

    6. Alternate No. 5 – Alternate Control Systems Manufacturer Deduct
        a. At the option of the Bidder provide a price deduct to replace Base Bid Control Systems Manufacturer with Alternate Controls System Manufacturer. Only acceptable alternate controls systems manufacturers are listed in Section 40 91 10 – Control Panels.

2. Page 00 11 00-5. After Paragraph 1.06.A.5.b., **Add** Paragraph 1.06.A.6. as follows

    6. Alternate No. 5 – Alternate Control Systems Manufacturer Deduct
        a. Specifications: Section 40 91 10
        b. Drawings: EC1 through EC33

SECTION 01 23 00 – CONTRACT CONSIDERATIONS AND ALTERNATES

2. Page 01 23 00-4. After Paragraph 1.04.A.4, **Add** Paragraph 1.04.A.5 as follows:

    5. Alternate No. 5 – Alternate Control Systems Manufacturer Deduct
        a. At the option of the Bidder provide a price deduct to replace Base Bid Control Systems Manufacturer with Alternate Controls System Manufacturer. Only acceptable alternate controls systems manufacturers are listed in Section 40 91 10 – Control Panels.

SECTION 02 51 10 – LIME POND DECOMMISSIONING

1. Page 02 51 10-4. **Add** the following text to Paragraph 3.03:

    F. Contractor shall be responsible for providing chemical acid for pH adjustment of decant water in accordance with permitted discharge requirements.

SECTION 07 14 00 - ELASTOMERIC MEMBRANE ROOFING

1. Page 07 14 00-2. **Add** the following manufacturer data to Paragraph 2.01.A.2: Tremco TP260.

SECTION 07 53 00 – ELASTOMERIC MEMBRANE ROOFING

2. Page 07 53 00-3. **Add** the following manufacturer data to Paragraph 2.01.B.5: Versico.

SECTION 08 17 43 - FRP FLUSH DOORS

1. Page 08 17 43-5. **Add** the following manufacturer data to Paragraph 2.01.A.2: Simon Door.

SECTION 08 44 13 – GLAZED ALUMINUM CURTAIN WALLS

1. **Add** attached specification section.
2. 8" mullion sections shall be 2, 4-inch mullions

3. Interior vestibule glazed aluminum framing shall be the curtain wall system.

SECTION 08 71 00 – DOOR HARDWARE

1. Page 08 71 00-7. **Add** the following manufacturer data to Paragraph 2.01.L.1: Nabco-GT 710 Automatic Door Operators.
2. Page 08 71 00-7. **Add** the following manufacturer data to Paragraph 2.01.L.1: Record-USA 8100 Automatic Door Operators.

SECTION 09 67 00 – FLUID APPLIED FLOORING

1. Page 09 67 00-2. **Add** the following manufacturer data to Paragraph 2.01.B.4: Stonhard

SECTION 10 51 00 – LOCKERS

1. Page 10 51 00-2. **Add** the following manufacturer data to Paragraph 2.01.A.2: ART Metal Products

SECTION 11 85 20 – INTEGRATED ACCESS CONTROL & SECURITY CAMERA SYSTEMS

1. **Add** attached specification section.

SECTION 11 85 21 – DOOR INTERCOM SYSTEM

1. **Add** attached specification section.
   A. Furnish and install one (1) door intercom at door 200B on the entrance side of the door.
   B. Furnish and install one (1) exterior door intercom at door 118A on the entrance side of the door.
   C. Furnish and install one (1) exterior door intercom on the south face of Chemical Unloading Garage 118.

SECTION 12 24 13 – ROLLER WINDOW SHADES

1. Page 12 24 13-2. **Add** the following manufacturer data to Paragraph 2.03: MechoShade Systems, Inc.

SECTION 12 35 53.13 – METAL LABORATORY CASEWORK AND EQUIPMENT

1. Page 12 35 53.13-5. **Add** the following manufacturer data to Paragraph 2.01.A.3: Jamestown Metal Products - Area Distributor Lance Service, Incorporated, 8845 East Research Center Road, New Hope, MN 55428. Tel: (763) 535-6123 to page 5, 2.01.A.

SECTION 14 20 20 – TWIN JACK HOLELESS HYDRAULIC FREIGHT ELEVATOR

1. Page 14 20 20-3. **Add** the following manufacturer data to Paragraph 2.01: Schumacher Elevator Company.

SECTION 22 15 19 – GENERAL-SERVICE PACKAGED AIR COMPRESSORS

1. Page 22 15 19-4. **Delete** paragraph 22 15 19.2.2.D.9 Receiver: ASME construction steel tank. **Replace** with paragraph 22 15 19.2.2.D.9 Receivers: ASME construction steel tank including the following manufacturer data:

   COMPRESSED AIR RECEIVER R-1 & R-2
   - A. Furnish and install compressed air "Wet" receivers Silvan Model 400, or equal, 400 Gallon vertical air receiver with base ring. 200 psi ASME rated, primer painted.
     1. Accessories to be included shall be as follows:
        - Safety Valve (Kingston Part #KIN 114-6-200, or equal).
        - Pressure Gauge, bottom mount, 2-1/2" face (Wika Part # 9767088, or equal).
        - Upper Front Inlet, 2" npt.
        - Side Outlet, 2" npt.
        - Bottom Drain Outlet, 1" npt.

   COMPRESSED AIR RECEIVER R-3
   - A. Furnish and install compressed air "Dry" receiver Silvan Model 200, or equal, 200 Gallon vertical air receiver with base ring. 200 psi ASME rated, primer painted.
     1. Accessories to be included shall be as follows:
        - Safety Valve (Kingston Part #KIN 114-4-200, or equal).
        - Pressure Gauge, bottom mount, 2-1/2" face (Wika Part # 9767088, or equal).
        - Side Inlet, 1-1/2" npt.
        - Side Outlet, 1-1/2" npt.
        - Bottom Drain Outlet, 3/4" npt.

SECTION 23 31 25 – LOUVERS

1. Page 23 31 25-2. **Add** the following manufacturer data to the following Paragraph 2.3.A: Nailor Ind.
2. Page 23 31 25-2. **Add** the following manufacturer data to the following Paragraph 2.03.B Sound Attenuating Louvers by Dynasonics: Change intake louver WL-3 and exhaust louver WL-4 assembly systems to a Dynasonics Model EAA-1245 Extruded Aluminum Louver Acoustic Airfoil Blade. See drawing M17 for locations and sizes.

SECTION 23 33 00 – AIR DUCT ACCESSORIES

1. Page 23 33 00-4. **Add** the following manufacturer data to the following Paragraph 2.3.A: Nailor Ind.
2. Page 23 33 00-5. **Add** the following manufacturer data to the following Paragraph 2.4.A: Nailor Ind.

SECTION 23 33 13 – SOUND ATTENUATORS

1. Page 23 33 13-2. **Change** the following manufacturer data to the following Paragraph 2.01.A: Low Frequency Silencer intake (SA-1) and exhaust (SA-2) system basis of design shall be Dynasonics Model LF99 (60" long). See drawing M17 for locations and sizes.

SECTION 23 34 19 – FUME EXHAUST SYSTEMS

1. Page 23 34 19-2. **Add** the following manufacturer data to the following Paragraph 2.01.A: Fume exhaust system basis of design shall be Car-Mon Products TSR-P36 tubing storage reel with a 4-button remote power station (115v/1phase). Exhaust fan basis of design shall be Car-Mon Series CMD-13 direct drive exhaust fan with a 1½ HP motor (460v/3phase). See drawing M16 for locations.

SECTION 23 34 23 – HVAC POWER VENTILATORS

1. Page 23 34 23-2. **Add** the following manufacturer data to the following Paragraph 2.1.A: Acme Engineering.
2. Page 23 34 23-2. **Add** the following manufacturer data to the following Paragraph 2.2.A: Acme Engineering.

SECTION 23 37 23 – HVAC GRAVITY VENTILATORS

1. Page 23 37 23-2. **Add** the following manufacturer data to the following Paragraph 2.3.A: Acme Engineering.

SECTION 23 82 36 – FINNED-TUBE RADIATION HEATERS

1. Page 23 31 25-1. **Add** the following manufacturer data to the following Paragraph 2.1.A: Vulcan Radiator.

SECTION 26 32 00 – PACKAGED GENERATOR ASSEMBLIES

1. Page 26 32 00-12. **Add** the following text to the end of the Paragraph 2.05:

H. The tank level measuring system shall include a set of form C contacts, 3 amps, 120VAC, that shall be adjustable. The contacts shall be set to illuminate the “full” light at the fill station when the tank is 95% full. Setpoints and processor and software to convert the fuel level to “gallons” shall be supported by a battery that shall maintain the program for not less than 1 year when power is interrupted.

I. The fuel level measuring system shall operate from a 120 VAC source.

J. All wiring shall be terminated on barrier type terminal strips. All displays and setpoints shall be front panel mounted.

K. The fuel system shall include a 304 stainless steel fill box mounted at the tank. The fill box shall include the following features:

1. Locking door with stainless steel hinge.
2. Quick detachable coupling with check valve, shutoff ball valve and fittings suitable for pumping from the delivery truck to the tank. The fuel line shall be a 3” line. The connection for fuel delivery hose shall be 2” cam-lock fuel fill device.
3. Provisions to store fuel that might drip during delivery. The storage shall be for up to 20 gallons. The fuel system fill box shall include a valve and a manual pump inside the enclosure so the fuel can be pumped to a container.

4. Indicator light. The light shall be a high intensity LED light that shall be labled “TANK FULL”. The voltage shall be coordinated with the fuel tank system.

5. The fuel fill box shall include an Owner selected fitting for matching fuel delivery trucks in the area.

SECTION 26 43 13 – TVSS-TYPE SURGE PROTECTION DEVICES

1. **Add** attached specification section.

SECTION 28 13 00 – INTEGRATED DOOR ACCESS CONTROL

1. **Add** attached specification section.
   A. Door access control shall be installed on door openings as scheduled in section 08 71 00 Door Hardware

SECTION 33 12 11 – ELASTOMERIC CHECK VALVES

1. Page 33 12 11-2. **Add** the following table following Paragraph 2.02.B:

Nominal Pipe Diameter, in.	Maximum Flowrate, gpm	Max. Allowable Headloss*, feet	Backpressure Capacity, psi	Elastomer Material	External Layer Elastomer Material
36	11,000	3.00	0	Neoprene	EPDM
30	3,750	2.00	0	Neoprene	EPDM

*Maximum allowable headloss at the specified maximum flowrate.

2. Page 33 12 11-2. **Delete** Paragraph 2.03.

SECTION 40 91 00 – INTRUMENTATION AND CONTROL SYSTEM DEVICES

1. Page 40 91 00-8. **Add** the following to Paragraph 2.08.A:

4. ABB.

2. Page 40 91 00-8. **Add** the following to Paragraph 2.09.A:

4. ABB.

SECTION 40 91 10 – CONTROL PANELS

1. Page 40 91 10-2. Paragraph 1.05.A.1. **Delete** paragraph in its entirety and replace with the following:
   1. Acceptable Control System Manufacturers:
      a. Base Bid: Kahler Automation, Fairmont, MN (507) 235-6648.
      b. Alternate 5 – Alternate Control Systems Manufacturers
         1) Wunderlich-Malec, Minnetonka, MN (952) 933-3222.
         2) Instrument Control Systems, Plymouth, MN (763) 559-0568.
         3) Integrated Process Solutions, Fosston, MN (218) 435-1703.
         4) No other manufacturers will be acceptable.

2. Page 40 91 10-3. Paragraph 1.05.B. **Delete** paragraph in its entirety and **Change** Paragraph 1.05.C. to 1.05.B.

3. Page 40 91 10-6. **Delete** line 2.02.C.1.j. in its entirety and **Change** line 2.02.C.1.k. to 2.02.C.1.j.

4. Page 40 91 10-6. **Delete** line 2.02.D.1.j. in its entirety and **Change** line 2.02.D.1.k. to 2.02.D.1.j.

5. Page 40 91 10-7. **Delete** line 2.02.G.1.i. in its entirety and **Change** line 2.02.G.1.j. to 2.02.G.1.i.

6. Page 40 91 10-15. **Delete** Paragraph 2.03.V. AMBIENT AIR TEMPERATURE SENSOR/TRANSMITTER in its entirety.

SECTION 40 91 11 – TELEMETRY EQUIPMENT (ALTERNATE 3)

1. In the footer on all pages in Section, **Delete** "40 91 10" and **Replace** with "40 91 11"

2. In the footer on all pages in Section, **Delete** "Control Panels" and **Replace** with "Telemetry Equipment"

3. In the footer on all pages in Section, **Delete** "*042911*" and **Replace** with "*052011 – Addendum No. 2*"

4. Page 40 91 11-2. Paragraph 1.05.A.1. **Delete** paragraph in its entirety and replace with the following:

    1. Acceptable Control System Manufacturers:
        a. Base Bid: Kahler Automation, Fairmont, MN (507) 235-6648.
        b. Alternate 5 – Alternate Control Systems Manufacturers
            1) Wunderlich-Malec, Minnetonka, MN (952) 933-3222.
            2) Instrument Control Systems, Plymouth, MN (763) 559-0568.
            3) Integrated Process Solutions, Fosston, MN (218) 435-1703.
            4) No other manufacturers will be acceptable.

5. Page 40 91 11-2. Paragraph 1.05.A.2. **Delete** paragraph in its entirety and **Change** Paragraph 1.05.A.3 to 1.05.A.2.

6. Page 40 91 11-2. Paragraph 1.05.B. **Delete** paragraph in its entirety and **Change** Paragraph 1.05.C. to 1.05.B.

SECTION 40 91 16 – PROCESS METERS

1. Page 40 91 16-5. **Add** the following to Paragraph 2.05.A:

    3. Steel-Mass Model 640S by Sierra Instruments.

SECTION 41 52 00 – Lime Handling and Storage System

1. Page 41 52 00-1. **Add** the following to Paragraph 1.02.B:

    4. Chemco Systems.

SECTION 43 11 23 – GAS HANDLING BLOWERS

1. Page 43 11 23-2. **Add** the following to Paragraph 1.03.A:

    1. or Kaeser Compressors.

2. Page 43 11 23-2. **Add** the following to Paragraph 1.03.B:

    1. or Kaeser Compressors.

SECTION 46 33 13 – SODIUM HYPOCHLORITE GENERATING EQUIPMENT

1. Page 46 33 13-13. **Add** the following text to Paragraph 2.04.A.6:

    i. OSHGS Supplier shall be responsible for providing Type 304 stainless steel Schedule 40 salt unloading pipe, including connection to the brine generation vessel, and three (3) adjacent long radius 90 degree pipe sweeps. Contractor shall supply all remaining salt unloading pipe, including fill connection and horizontal straight pipe run. Supplier provided pipe sweeps will connect with Contractor provided pipe run as shown on the Project Drawings. Contractor to confirm and coordinate connection type.

SECTION 46 33 33 – POLYMER BLENDING AND FEED EQUIPMENT

1. Page 46 33 33-4. **Add** the following to Paragraph 2.02.A:

    3. Enpro Technologies.

SECTION 46 36 33 – DRY CHEMICAL VOLUMETRIC FEED EQUIPMENT

1. Page 46 36 33-2. **Add** the following to Paragraph 2.02.A:

    4. Enpro Technologies.

SECTION 46 51 21 – AERATION DIFFUSERS

1. Page 46 51 21-3. **Add** the following to Paragraph 2.01.A:

    3. SSI Aeration, Inc.
    4. Environmental Dynamics International (EDI).

VOLUME 4 OF 4 - ABATEMENT DOCUMENTS

1. Revise the BUDD ELEMENTARY SCHOOL ASBESTOS REMOVAL DOCUMENTS
   A. Division 1, Section 01013, Paragraph 1.2-C
      1. **Add:** All asbestos air monitoring & air sample analysis for this project will be the responsibility of the asbestos abatement contractor.
   B. Division 1, Section 01013, Paragraph 1.2-C, Phase #2-Ground Level 1958 Addition
      1. **Add:** Areas included in Phase #2 are Rooms 304, 307, 308, Restrooms, Chapter 1, Speech, offices and hallways. Also included in this Phase is the hallway adjacent to the Boiler Room. No work is required in the Music Room.
      2. Also included in this phase is the removal and disposal of the boiler room fire door and two sinks in Room 305.
   C. Division 1, Section 01013, Paragraph 1.2-C, Phase #3- 1958 Window Caulk Abatement
      1. **Add:** Included in Phase #3 is the removal and disposal of all window caulk and glazing from the South Gym window systems.
   D. Division 1, Section 01013, Paragraph 1.2-C, Phase #5- First Floor of 1950 Building
      1. **Delete:** Delete the Stage Area from this phase (first paragraph, last sentence).
   E. Drawings
      1. **Add:** Include the attached WM Budd School 1st & 2nd Floor Plans and WM Budd School Lower Level & Basement Plan

2. Revise the WATER TREATMENT PLANT ASBESTOS REMOVAL DOCUMENTS
   A. **Add** the attached Fairmont Water Treatment Plant Lead Paint Sample Results document.

CHANGES TO DRAWINGS

Drawing C18

1. **Add Note:** The GeoWeb Retaining shall be designed by the GeoWeb manufacturer and constructed in accordance with the GeoWeb manufacturer's recommended details.

Refer to Drawing C26

1. **Sanitary sewer manhole detail note 11.** Internal manhole seals for S-1, S-2, S-3, and S-4 will be provided and installed by others. Contractor shall notify owner when complete so manhole seal provider can be contacted for installation.

Drawing A11

1. **Delete** original drawing A11 dated April 2011 and **replace** with the attached Drawing A11, Revision No. 1, dated May 20, 2011.
   A. Dimensional change on the north wall of Reclamation Basin 2.

Drawing A19

1. The W1 windows in Control Room 305 shall be a 60 minute hollow metal frame with GL-8 glazing
2. The W8 window in Laboratory 304 shall be a 60 minute hollow metal frame with GL-8 glazing

3. All W1 windows in Lunch Room 302 and Filter Operations Corridor 326 (GAC and Conventional Filter Room) shall be window type W3.
4. All W1 windows in Stair "A" shall be window type W2.

Drawing A20

1. The W1 windows in Office 309 shall be a 60 minute hollow metal frame with GL-8 glazing
2. All W1 windows in the Solids Contact Softening Basin Room shall be window type W3.
3. All W1 windows in Stair "A" shall be window type W2.

Drawing A22

1. The W3 windows in the museum shall be non-operable

Drawing A40

1. Window types W1, W2, W3, W4, W6, and W7 shall be aluminum framing
   A. Exception: W1 windows in Control Room 305 and office 309 shall be hollow metal as noted above.

Drawing A41

1. Window types W9, W10, W11, W12, W13, W14 and W15 shall be aluminum framing

Drawing S01

1. **Delete** original drawing S01 dated April 2011 and **replace** with the attached Drawing S01, Revision No. 1, dated May 20, 2011.
   A. Dimensional change on the north wall of Reclamation Basin 2.

Drawing AD2-1

1. **Add** the attached Drawing AD2-1, dated May 20, 2011.
   A. Generator exhaust pipe riser section.

Drawing M10

1. **Add Note:** At the cold water main to the water closet group in room 311 and 312 provide and install a water-hammer arrester sized in accordance with the manufacturer's instructions.

Drawing M11

1. **Delete** original drawing M11 dated April 2011 and **replace** with the attached Drawing M11, Revision No. 2, dated May 20, 2011.
   A. Compressed air extension to three (3) dry chemical feed systems.

Drawing M18

1. **Add Note:** Exhaust fan EF-2 backwash interlock - Install a relay at the process backwash blower motor to interlock fan operation with the backwash cycle. Provide a time clock to provide an additional 20 minutes (adjustable) of fan operation after the backwash blower is shutoff.

Drawing E02

1. **Change** Numbered Note 3 to read: Furnish and install four (4) Schedule 80 PVC conduits with nylon pull cord. Conduits shall include one 4-inch conduit for telephone, one 2-inch conduit for CATV, one 2-inch conduit for internet, and one 2-inch conduit for fiber optic. At the property line furnish and install two handholes per detail on sheet E53. Route each conduit between the handholes at the property line and the server room. Coordinate exact location with service providers.

Drawing E04

1. **Add** circuit 7025 to SPU-1 control panel.

2. **Add** two dedicated duplex, GFI outlets for dehumidifiers at 48" near SPU-1 and fed from PP11-16 and PP11-18 with 2-1/C-#12+Gnd-3/4" each. See Sheet M04 for exact locations.

Drawing E05

1. **Add** circuit 7026 to SPU-2 control panel.

2. **Add** three dedicated duplex, GFI outlets for dehumidifiers at 48". One shall be located in the north end of the corridor and fed from PP11-20, one shall be located at the east end of the corridor and fed from PP11-22, and one shall be located at the south end of Stair A and fed from PP11-24, with 2-1/C-#12+Gnd-3/4" each. See Sheet M04 for exact locations.

Drawing E06

1. **Relocate** the north UH-2 in the generator room to the adjacent storage room.

2. **Add** 2-1/C-#12+Gnd-3/4" from PP41 to the gas detection panel at the northeast corner of the garage. See Sheet M17 for exact location.

Drawing E07

1. **Add** 2-1/C-#12+Gnd-3/4" from PP32 to the gas detection panel at the northwest corner of the chemical unloading garage. See Sheet M16 for exact location.

2. **Add** to Numbered Note 7: Route 2-1/C-#12+GND-3/4" from each control station to PP32.

Drawing E08

1. **Add** four dedicated duplex, GFI outlets for dehumidifiers at 48". One shall be located in the north end of the corridor 109 and fed from PP11-26, one shall be located at the south end of the corridor 109 and fed from PP11-28, one shall be located near Filter Press Feed Pump 2

and fed from PP11-30, and one shall be located near Filter Press Feed Pump 4 and fed from PP11-32, with 2-1/C-#12+Gnd-3/4" each. See Sheet M06 for exact locations.

Drawing E09

1. **Add** eight dedicated duplex, GFI outlets for dehumidifiers at 48". One shall be located in electrical room 110 and fed from PP22-8, one shall be located near CU-1 and fed from PP22-10, one shall be located on the east end of the filter pipe gallery 129 and fed from PP22-16, one shall be located in the north end of corridor 131 and fed from PP22-18, one shall be located in the south end of corridor 131 and fed from PP22-34, two shall be in the west end of corridor 127 and fed from PP22-12 and PP22-24, one shall be located in the east end of corridor 127 and fed from PP22-14, with 2-1/C-#12+Gnd-3/4" each. See Sheet M05 and M06 for exact locations.

2. **Change** the feeder for CU-1 to #10AWG

Drawing E10

1. **Add** two dedicated duplex, GFI outlets for dehumidifiers at 48". Both shall be located in the south end of higher service pump room 111 and fed from PP22-20 and PP22-22, with 2-1/C-#12+Gnd-3/4" each. See Sheet M05 for exact locations.

2. **Delete** the telephone termination cabinet in electrical room 112.

3. **Add** circuit 7027 to SPU-3 control panel.

Drawing E11

1. **Change** the numbered notes for MAU-2 from 10 and 11 to 11 and 12, respectively.

2. **Add** 2-1/C-#12+Gnd-3/4" from the 120V disconnect for MAU-2 and MAU-3 to the associated control panel. See Sheet M20 for MAU control panel locations.

3. **Delete** roof mounted outlet near EF-7

Drawing E12

1. **Add** to numbered note 12: "See sheet M25 for VFD mounting locations.
2. Delete the disconnect and power source for air dryer AD-1
3. Add a 30A, 480V, 3P, NEMA 1, HD, NF disconnect for AD-1 and route 3-1/C-#10-3/4" to DP1.

Drawing E13

1. **Add** four dedicated duplex, GFI outlets for dehumidifiers at 48". One shall be located in the west end of the corridor 325 and fed from PP22-32, one shall be located at the east end of the corridor 325 and fed from PP22-30, one shall be located at the east end of the filter operations corridor and fed from PP22-28, and one shall be located at north end of Stair A and fed from PP22-26, with 2-1/C-#12+Gnd-3/4" each. See Sheet M09 for exact locations.
2. **Delete** the outlet near EF-3.

Drawing E14

1. **Added** CATV, voice, data and SCADA jacks.
2. **Revised** outlet locations and heights
3. **Deleted** roof-mounted outlets.
4. **Added connections to exhaust fan EF-4.**
5. **Added** alarm circuits to AHU-1.
6. **Deleted** the telephone cabinet in the server room.
7. **Added** CUH-8 connections.
8. **Delete** Drawing E14, Revision 0, dated April 29, 2011 and **Replace** with attached Drawing E14, Revision No. 1, dated May 19, 2011.

Drawing E15

1. **Add** circuit 7035 to Sump Pump SPU-4 pump power disconnect.
2. **Add** circuit 7028 to Sump Pump SPU-4 control panel.
3. **Add** wall-mounted fiber optic patch panel next to RWCP-01.
4. **Add** two 10kW, 480V, 3PH electric unit heaters with integral thermostat, disconnect switch and mounting hardware. Berko HUHAA, or equal. See one-line diagram for circuit numbers. Install one in the deep intake side and one in the shallow intake side.

Drawing E16

1. **Change** sample pump tag SP2715 to SP5031.
2. **Delete** sample pumps SP5941 and SP5931 and relocate to Sheet E20.

Drawing E18

1. **Add** power for the fuel tank level electronics and fill box. Route 2-1/C-#12+Gnd-3/4" to PP41. Connect "Tank Full" indicating light at fill box to fuel tank level electronics.

Drawing E20

1. **Change** the tag PCV5114 to PMV5114 and **add** circuit 7040.
2. **Change** the tag PCV5214 to PMV5214 and **add** circuit 7041.
3. **Change** the tag PCV5314 to PMV5314 and **add** circuit 7042.
4. **Change** the tag PCV5414 to PMV5414 and **add** circuit 7043.
5. **Change** the tag PCV5514 to PMV5514 and **add** circuit 7045.
6. **Change** the tag PCV5614 to PMV5614 and **add** circuit 7046.
7. **Change** the tag PCV5714 to PMV5714 and **add** circuit 7047.
8. **Change** the tag PCV5814 to PMV5814 and **add** circuit 7048.
9. **Change** the tag PCV5412 to PMV5412
10. **Add** SP5931 to the southeast corner of the filter pipe gallery and SP5941 to the northeast corner of the filter pipe gallery.

Drawing E21

1. **Add** tag RSP6214 to the Reclaim Basin No. 1 Sludge Pump.
2. **Add** tag RSP6209 to the Reclaim Basin No. 1 Recycle Pump.
3. **Add** tag RSP6309 to the Reclaim Basin No. 2 Recycle Pump.
4. **Add** tag RSP6314 to the Reclaim Basin No. 2 Sludge Pump.

Drawing E22

1. **Delete** circuits 2001, 3002, 4002, and 5002 to MCP-01.
2. **Add** circuit 7017 to MCP-01.
3. **Add** circuit 7013 to the MDP

Drawing E25

1. **Delete** circuit 6267 at the Water Vending P.O.S. terminal.
2. **Add** circuit 7012 to the Water Vending P.O.S terminal.

Drawing E26

1. **Delete** circuit 1595 to VCP2010 and 1635 to VCP2015.
2. **Add** circuit 7005 to VCP2010 and 7006 to VCP2015.
3. **Add** tag ECV2011 to the electric diverter valve.

Drawing E27

1. **Delete** circuit 4002 to FCP-01 and 5002 to FCP-02.
2. **Add** circuit 7016 to FCP-01 and 7018 to FCP-02.

Drawing E28

1. **Delete** circuit 1521 to VCP2020.
2. **Add** circuit 7007 to VCP2020.
3. **Add** tag MXR3420 to LSHB No.1 Mixer.

Drawing E29

1. **Delete** circuit 1551 to VCP2040.
2. **Add** circuit 7008 to VCP2040.
3. **Add** tag MXR3520 to LSHB No.2 Mixer.

Drawing E30

1. **Add** circuit 7002 to VCP2705.

Drawing E31

1. **Delete** circuit 1486 to VCP3601, circuit 1508 to VCP3602, circuit 1667 to VCP2300, and circuit 3002 to CCP-01.
2. **Add** circuit 7004 to VCP3601, circuit 7005 to VCP3602, circuit 7010 to VCP2300, circuit 7015 to CCP-01.

Drawing E32

1. **Change** the bus bracing to 65,000A RMS SYM.
2. **Change** the location of the power monitor to monitor power downstream of the transfer switch.

Drawing E33

1. **Add** two N.O. contacts to the blower VFD that close when the blower is running. Contacts shall be used for exhaust fan interlock.
2. **Change** the exhaust fan tags to EF-11 and EF-12.

Drawing E45

1. **Add** two N.O. contacts to the RWIS blower VFD that close when the blower is running. Contacts shall be used for exhaust fan interlock.

Drawing E47

1. **Add** the transfer fans to the HVAC starter schematic.

Drawing E50

1. **Added** panel PPUPS
2. **Delete** Drawing E50, Revision 0, dated April 29, 2011 and **Replace** with attached Drawing E50, Revision No. 1, dated May 19, 2011.

Drawing E51

1. **Add** fixture Type U: Fluorescent Wrap, Lithonia #CA-2-32-MVOLT-GEB10RS, 2-32-T8-3500 DEG K.

Drawing E60

1. **Add** attached Drawing E60, Revision 0, dated May 19, 2011.

Drawing E61

1. **Add** attached Drawing E61, Revision 0, dated May 19, 2011.

Drawing E62

1. **Add** attached Drawing E62, Revision 0, dated May 19, 2011.

Drawing E63

1. **Add** attached Drawing E63, Revision 0, dated May 19, 2011.

Drawing EC05

1. **Add** the following Digital Inputs to Rack 0, Slot 6:
    a. Supply Fan Fail
    b. Discharge Air Temp Fail
    c. Freeze-stat Shutdown
    d. Sump Pump SPU-1 High Level
    e. Sump Pump SPU-2 High Level
    f. Sump Pump SPU-3 High Level

Drawing EC13

1. **Delete** Drawing EC13, Revision No. 1, dated 5-11-11 and **Replace** with the attached Drawing EC13, Revision No. 2, dated 5-18-11.

Drawing EC14

1. **Delete** Drawing EC14, Revision No. 1, dated 5-11-11 and **Replace** with the attached Drawing EC14, Revision No. 2, dated 5-18-11.

Drawing EC17

1. **Delete** Drawing EC17, Revision No. 1, dated 5-11-11 and **Replace** with the attached Drawing EC17, Revision No. 2, dated 5-18-11.

Drawing EC18

1. **Delete** Drawing EC18, Revision No. 1, dated 5-11-11 and **Replace** with the attached Drawing EC18, Revision No. 2, dated 5-18-11.

Drawing EC20

1. **Add** the following Digital Input to Rack 0, Slot 4:
    a. Sump Pump SPU-4 High Level

CLARIFICATIONS

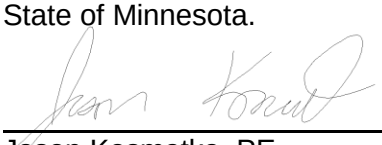
1. Product selections shall be from the manufactures full selection of finishes.
2. The base materials specified as MnDOT Class 5 shall be aggregate material complying with MnDOT specifications.
3. Where gypsum board is specified on walls with window and/or door openings, provide painted gypsum board returns at the head, jambs, and sill.

ATTACHMENT LIST TO THIS ADDENDUM

1. Cable and Conduit Schedule consisting of 3 pages.
2. 00 45 14 – Subcontractor Qualification Forms.
3. 08 44 13 – Glazed Aluminum Curtain Walls.
4. 11 85 20 – Integrated Access Control & Security Camera Systems.
5. 11 85 21 – Door Intercom System.
6. 26 43 13 – TVSS-Type Surge Protective Devices.
7. 28 13 00 – Integrated Door Access Control.
8. WM Budd School 1st & 2nd Floor Plans.
9. WM Budd School Lower Level & Basement Plan.
10. Fairmont Water Treatment Plant Lead Paint Sample Results.
11. Drawing A11, Revision No. 1, Dated 5-20-11.
12. Drawing S01, Revision No. 1, Dated 5-20-11.
13. Drawing AD2-1, Revision No. 2, Dated 5-20-11.
14. Drawing M11, Revision No. 2, Dated 5-20-11.
15. Revised Drawing E14.

16. Revised Drawing E50.
17. Drawing E60.
18. Drawing E61.
19. Drawing E62.
20. Drawing E63.
21. Drawing EC13, Revision No. 2, Dated 5-18-11.
22. Drawing EC14, Revision No. 2, Dated 5-18-11.
23. Drawing EC17, Revision No. 2, Dated 5-18-11.
24. Drawing EC18, Revision No. 2, Dated 5-18-11.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am duly registered as a Professional Engineer under the laws of the State of Minnesota.



Jason Kosmatka, PE
Registration Number 45841
May 20, 2011

END OF ADDENDUM NO. 2

Fairmont, Minnesota
Water Treatment Plant Improvements
CABLE AND CONDUIT SCHEDULE
ADDENDA ITEMS - May 19, 2011

CIRCUIT NUMBER	CONDUIT NUMBER	CONDUCTOR QUANTITY AND SIZE	CONDUIT SIZE	VOLTS & PHASE	FROM	VIA	TO	REMARKS
7000	C7000	1-CAT6	1"	DATA	NWP-01	C7000	VCP2210 RECARBONATION-PRESSURE FEED PANEL 1	
7001	C7001	1-CAT6	1"	DATA	NWP-01	C7001	VCP2220 RECARBONATION-PRESSURE FEED PANEL 2	
7002	C7002	1-CAT6	1"	DATA	NWP-01	C7002	VCP2705 AMMONIA FEED SYSTEM PANEL	
7003	C7003	1-CAT6	1"	DATA	NWP-01	C7003	VCP3601 FILTER PRESS CONTROL PANEL 1	
7004	C7004	1-CAT6	1"	DATA	NWP-01	C7004	VCP3602 FILTER PRESS CONTROL PANEL 2	
7005	C7005	1-CAT6	1"	DATA	NWP-01	C7005	LIME SILO NO. 1 CONTROL PANEL	
7006	C7006	1-CAT6	1"	DATA	NWP-01	C7006	LIME SILO NO. 2 CONTROL PANEL	
7007	C7007	1-CAT6	1"	DATA	NWP-01	C7007	LIME SLAKER NO. 1 CONTROL PANEL	
7008	C7008	1-CAT6	1"	DATA		C7008	LIME SLAKER NO. 2 CONTROL PANEL	
7009	C7009							
7010	C7010	1-CAT6	1"	DATA	NWP-01	C7010	OSHGS CONTROL ENCLOSURE	
7011	C7011	1-CAT6	1"	DATA	NWP-01	C7011	UPS	
7012	C7012	1-CAT6	1"	DATA	NWP-01	C7012	WATER VENDING P.O.S. TERMINAL	
7013	C7013	1-CAT6	1"	DATA	NWP-01	C7013	MAIN DISTRIBUTION PANEL POWER MONITOR	
7014	C7014							
7015	C7015	1-CAT6	1"	DATA	NWP-01	C7015	CHEMICAL CONTROL PANEL CCP-01	
7016	C7016	1-CAT6	1"	DATA	NWP-01	C7016	FILTER CONTROL PANEL FCP-01	
7017	C7017	1-CAT6	1"	DATA	NWP-01	C7017	MASTER CONTROL PANEL MCP-01	
7018	C7018	1-CAT6	1"	DATA	NWP-01	C7018	FILTER CONTROL PANEL FCP-02	
7019	C7019	1-CAT6	1"	DATA	NWP-01	C7019	WTP POLLING MASTER	
7020	C7020							
7021	C7021							
7022	C7022							
7023	C7023							
7024	C7024							
7025	C7025	2-1/C-#14	3/4"	CONTROL	SUMP PUMP SPU-1	C7025	PANEL MCP-01	
7026	C7026	2-1/C-#14	3/4"	CONTROL	SUMP PUMP SPU-2	C7026	PANEL MCP-01	
7027	C7027	2-1/C-#14	3/4"	CONTROL	SUMP PUMP SPU-3	C7027	PANEL MCP-01	
7028	C7028	2-1/C-#14	3/4"	CONTROL	SUMP PUMP SPU-4	C7028	PANEL RWCP-01	
7029	C7029							
7030	C7030	4-1/C-#14	3/4"	CONTROL	AIR HANDLING UNIT AHU-1	C7030	PANEL MCP-01	
7031	C7031	4-1/C-#14	3/4"	CONTROL	AIR HANDLING UNIT AHU-2	C7031	PANEL MCP-01	
7032	C7032							
7033	C7033							
7034	C7034							

Fairmont, Minnesota
Water Treatment Plant Improvements
CABLE AND CONDUIT SCHEDULE
ADDENDA ITEMS - May 19, 2011

CIRCUIT NUMBER	CONDUIT NUMBER	CONDUCTOR QUANTITY AND SIZE	CONDUIT SIZE	VOLTS & PHASE	FROM	VIA	TO	REMARKS
7035	C7035	3-1/C-#12+GND	3/4"	480-3	RWIS MCC	C7035	SUMP PUMP SPU-4	
7036	C7036	4-1/C-#4+GND	3/4"	120/208-3	PP32	C7036	UNINTERRUPTIBLE POWER SUPPLY (UPS)	
7037	C7037	4-1/C-#4+GND	3/4"	120/208-3	UPS	C7037	UPS PANELBOARD	
7038	C7038							
7039	C7039							
7040	C7040	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-01	C7040	PMV5114 CONVENTIONAL FILTER 1 FILTER-WASTE VALVE	
7041	C7041	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-01	C7041	PMV5214 CONVENTIONAL FILTER 2 FILTER-WASTE VALVE	
7042	C7042	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-01	C7042	PMV5314 CONVENTIONAL FILTER 3 FILTER-WASTE VALVE	
7043	C7043	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-01	C7043	PMV5414 CONVENTIONAL FILTER 4 FILTER-WASTE VALVE	
7044	C7044							
7045	C7045	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-02	C7045	PMV5514 GAC FILTER 1 FILTER-WASTE VALVE	
7046	C7046	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-02	C7046	PMV5614 GAC FILTER 2 FILTER-WASTE VALVE	
7047	C7047	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-02	C7047	PMV5714 GAC FILTER 3 FILTER-WASTE VALVE	
7048	C7048	2-2/C-#16 SHIELDED	3/4"	SIGNAL	PANEL FCP-02	C7048	PMV5814 GAC FILTER 4 FILTER-WASTE VALVE	
7049	C7049							
7050	C7050	1-1/C-#6 BARE-STRANDED GND	3/4"	GND	MDP GROUND BUS	C7050	TELEPHONE BOARD	
7051	C7051	1-1/C-#6 BARE-STRANDED GND	3/4"	GND	MDP GROUND BUS	C7050	NWP-01	
7052	C7052							
7053	C7053							
7054	C7054							
7055	C7055							
7056	C7056							
7057	C7057							
7058	C7058							
7059	C7059							
7060	C7060							
7061	C7061							
7062	C7062							
7063	C7063							
7064	C7064							
7065	C7065							
7066	C7066							
7067	C7067							
7068	C7068							
7069	C7069							
7070	C7070							
7071	C7071							
7072	C7072							
7073	C7073							
7074	C7074							

Fairmont, Minnesota
Water Treatment Plant Improvements
CABLE AND CONDUIT SCHEDULE
ADDENDA ITEMS - May 19, 2011

CIRCUIT NUMBER	CONDUIT NUMBER	CONDUCTOR QUANTITY AND SIZE	CONDUIT SIZE	VOLTS & PHASE	FROM	VIA	TO	REMARKS
7075	C7075							
7076	C7076							
7077	C7077							
7078	C7078							
7079	C7079							
7080	C7080							
7081	C7081							
7082	C7082							
7083	C7083							
7084	C7084							
7085	C7085							
7086	C7086							
7087	C7087							
7088	C7088							
7089	C7089							
7090	C7090							
7091	C7091							
7092	C7092							
7093	C7093							
7094	C7094							
7095	C7095							
7096	C7096							
7097	C7097							
7098	C7098							
7099	C7099							

NOTES FOR CABLE AND CONDUIT SCHEDULE:

1. DO NOT ROUTE CABLES FOR DIVISION 15 HVAC CONTROL SYSTEM IN THE DIVISION 16 CONDUIT SYSTEM.
2. CIRCUITS MAY BE COMBINED IN COMMON CONDUITS PER THE FOLLOWING:

   a. UP TO FOUR CONSTANT-SPEED MOTOR FEEDER CIRCUITS MAY BE COMBINED IN A COMMON CONDUIT. INCREASE CONDUCTOR SIZES AS REQUIRED PER N.E.C. DERATION RULES. LIMIT CONDUIT FILL TO 30% MAXIMUM.

   b. CONTROL CIRCUITS MAY BE COMBINED IN COMMON CONDUITS. LIMIT CONDUIT FILL TO 30% MAXIMUM.

   c. SIGNAL CIRCUITS MAY BE COMBINED IN COMMON CONDUITS. LIMIT CONDUIT FILL TO 30% MAXIMUM.

   d. VARIABLE-SPEED MOTOR FEEDER CIRCUITS POWERED BY VFDS MAY NOT BE COMBINED. PROVIDE SEPARATE CONDUIT FOR EACH CIRCUIT. CONTROL CIRCUITS MAY NOT BE ROUTED WITH VFD POWER CIRCUITS.

REMARKS:

1. INCLUDES SPARE CONDUCTORS.
2. VIA DISCONNECT SWITCH.
3. CONDUIT FOR FUTURE EQUIPMENT. STUB UP AS INDICATED ON PLANS.
4. COORDINATE WITH TC CONTRACTOR
5. CONFIRM WITH EQUIPMENT SUPPLIER

SECTION 00 45 14
SUBCONTRACTOR QUALIFICATIONS FORMS

Bidder's Name: _____

Electrical Subcontractor Information		
Full Legal Name:		
Organization Type:		
State of Incorporation:		
Address for Notices:		
Contact Name:		**Contact Number:**
Years in Business:		
Dollar Value of Water/Wastewater Treatment Plant Construction Work in Past 10 Years:		
Description of Work that will be Self-Performed:		

Bidder's Name: _____

Electrical Subcontractor Project Reference	
Project Name:	
Year Constructed:	
Contract Amount ($):	
Project Owner Contact Name and Number	
Project Engineer Contact Name and Number	
Project Description	
Current Employees with Experience on this Project	
Name	**Responsibility**

Bidder's Name: _____

Mechanical Subcontractor Information		
Full Legal Name:		
Organization Type:		
State of Incorporation:		
Address for Notices:		
Contact Name:		**Contact Number:**
Years in Business:		
Dollar Value of Water/Wastewater Treatment Plant Construction Work in Past 10 Years:		
Description of Work that will be Self-Performed:		

Bidder's Name: _____

Mechanical Subcontractor Project Reference	
Project Name:	
Year Constructed:	
Contract Amount ($):	
Project Owner Contact Name and Number	
Project Engineer Contact Name and Number	
Project Description	
Current Employees with Experience on this Project	
Name	**Responsibility**

DIVISION 08 – OPENINGS

SECTION 08 44 13 – GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed curtain wall with vision glazing.

1.02 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association.

C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers.

D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes Metric.

F. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glazing and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.

B. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:
   1. Kawneer; Product 1600 Wall System 1: www.kawneer.com.

B. Other Acceptable Manufacturers:
   1. Manufacturers providing equivalent products listed in Section 08 43 13 - Aluminum-Framed Storefronts.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 CURTAIN WALL

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I color anodized.
      a. Color: Champagne.
      b. Factory finish all surfaces that will be exposed in completed assemblies.
      c. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
      d. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.

3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the requirements of the International Building code.
a. Positive Design Wind Load: 25 lbf/sq ft.
b. Negative Design Wind Load: 25 lbf/sq ft.
2. Movement: Accommodate the following movement without damage to components or deterioration of seals:
a. Expansion and contraction caused by 180 degrees F surface temperature.
b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
c. Movement of curtain wall relative to perimeter framing.
d. Deflection of structural support framing, under permanent and dynamic loads.

2.03 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).

B. Glazing: As specified in Section 08 80 00.

C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

D. Glazing Accessories: As specified in Section 08 80 00.

2.05 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating or AAMA 612 electrolytically deposited colored anodic coating with electrolytically deposited organic seal; not less than 0.7 mils thick.

2.06 ACCESSORIES

A. Shims: Plastic shims.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 80 00, using exterior dry glazing method.

I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.05 PROTECTION

A. Protect installed products from damage during subsequent construction.

END OF SECTION

DIVISION 11 – EQUIPMENT

SECTION 11 85 20 – INTEGRATED ACCESS CONTROL AND SECURITY CAMERA SYSTEMS

PART 1 PRODUCT CATEGORY: AMERICAN DYNAMICS FIXED IP CAMERAS

1.01 SUMMARY

A. Section Includes (for Laboratory and Control Room):
   1. Modular and custom steel casework.

1.02 DESCRIPTION

A. The illustra 400 Series IP camera

1.03 BID SPECIFICATION

A. The camera shall utilize the Sony IMX035 CMOS sensor.

B. The minidome and bullet cameras shall have an integrated 3.3-12mm IR corrected varifocal lens.

C. The camera shall have a dome enclosure complying with IP66 weatherproofing standards.

D. The camera shall dome chassis shall be vandal resistant constructed of aluminum with a polycarbonate dome bubble (illustra 400 outdoor fixed dome and bullet only).

E. The camera shall have a 3-axis gimbal with 360° pan 90° tilt and 180° Z-rotation for easy and accurate positioning.

F. The camera shall be surface mountable with optional pendant mount or wall mount.

G. The camera shall be H.264 (MPEG4, Part 10) compliant.

H. The camera shall have dual standard compression support with simultaneous streaming of both H.264 and MJPEG formats.

I. The camera shall have multi-streaming support of up to 8 non-identical concurrent streams (different frame rate, bit rate, resolution, quality and compression format).

J. The camera's bit rate control shall be selectable between constant bit rate and variable constrained variable bit rate.

K. The camera shall have Real Time Streaming Protocol (RTSP) support allowing for compatibility with media players such as Windows Media Player, Apple QuickTime, VLC Player and others.

L. The camera shall output at a maximum resolution of 896(H) x 720(V) pixels at a maximum frame rate of 30 frames per second (FPS).

M. It shall be possible to program the camera to output a variety of lower resolution images, i.e., CIF and D1 30 FPS.

N. The camera shall provide 5 level settings for quality of H.264 compression.

O. The camera shall support a HTTP and RTSP/RTP network protocols.

P. The cameras shall feature motion detection with a minimum of 500 independent detection zones.

Q. The camera shall feature automatic exposure, automatic white balance, shutter speed control, 50/60Hz selectable flicker control, programmable brightness, saturation, gamma, sharpness, windowing and decimation, simultaneous delivery of full-field view.

R. The camera shall incorporate necessary algorithms and circuits to detect motion in low light with clarity.

S. The camera shall support a minimum illumination of 0.2 Lux @ F1.2 in color mode.

T. The camera shall support an IR sensitive minimum illumination of 0.01 Lux in B/W mode.

U. The camera's primary power source shall be Power over Ethernet (PoE) complying with the IEEE 802.3af standard.

V. The camera shall have IR illuminators capable of illumination up to 54 feet powered by PoE (802.3af).

W. The camera shall have the alternative option to be powered from between a 12V DC or 24V AC power source providing at least 5W of power.

X. The camera's operating ambient temperature shall be -40°C (-40°F) to 50ºC (122ºF) for warm start conditions (for outdoor fixed dome and bullet models).

Y. The camera shall be FCC Part 15, Class A and CE compliant.

Z. The camera shall have the ability to directly export snapshot images in JPEG form and video clips via email, FTP, Network storage and on board SDHC card.

AA. The camera shall be able to store and utilize the user name and password of the SMTP server to enable protected email export.

BB. The camera shall be able to record to an SDHC card based on motion detection, alarm input, or on schedule managed via the camera's web-based GUI.

CC. The camera shall be able to record to a SDHC card in a circular fashion.

DD. Recorded video on the cameras SDHC card shall be accessible via the cameras web browser GUI.

EE. The camera shall have the capability to provide at least 3 independent privacy zones.

FF. The camera shall have 48MB of buffer storage for pre and post alarm capture.

GG. The camera shall have at least one alarm output and one alarm input.

HH. The camera shall have a Linux based operating system.

II. The camera shall have RSA-based public key cryptography with a 1024 bit private key length.

JJ. The camera shall support bi-directional audio in half and full duplex.

KK. The camera shall support wide dynamic range up to 100dB with 9 quality settings.

PART 2 PRODUCT CATEGORY: AMERICAN DYNAMICS ENVIRONMENTAL CAMERA HOUSINGS

2.01 DESCRIPTION

A. High quality environmental housing designed to provide an excellent barrier against indoor and outdoor environments for most CCD cameras with fixed or zoom lenses.

2.02 PERFORMANCE SPECIFICATIONS

A. The camera housing must provide a unique 180° opening cover to provide full and easy access to the camera and lens for trouble-free installation and servicing.

B. The maximum camera/lens combination length must be no less than 304.8 mm (12.0 in), including connectors.

C. The housing must have a camera platform that can be secured in any position along the full length of the housing. This platform shall be constructed of a rigid non-conductive material to help eliminate common grounding problems.

D. The camera housing must be constructed of a high-impact Magnum® 941 Polymer with a 4.8 mm (.19 in) Lexan® viewing window.

E. The camera housing will protect against water and dust intrusion and meet a minimum of IP63 and NEMA-3R ratings. An optional sunshield must be available to protect the entire top half of the housing from solar radiation.

F. The housing must offer an optional thermostatically controlled pad heater and automatically regulate its output to provide heat in the housing and maintain a clear viewing window. The heater shall operate with either 24 VAC or 24 VDC supply voltages.

G. The housing must offer an optional thermostatically regulated 24 VAC blower.

H. Two weatherproof glands must be provided on the bottom of the housing for cable entry.

I. The camera housing must have a light gray epoxy finish.

J. The housing must be secured from unauthorized entries by the use of tamper resistant screws.

K. Optional wall or ceiling mounts must be available for the camera housing. The mounts must have a weight load capacity of no less than 9.1 Kg (20 lbs.), and have a light gray finish to match the camera housing. The mounts shall be suitable for indoor or outdoor applications.

L. The camera housing and mounts shall be an American Dynamics Illustra 400 Series.

2.03 MINIMUM PERFORMANCE SPECIFICATIONS

A. The camera housing must meet the following requirements:

B. Mechanical:

1.

2. Construction:
   a. Housing: Magnum® 941 Polymer
   b. Viewing Window: 4.8 mm (.19 in) Lexan®
   c. Finish: Epoxy
   d. Color: Light gray
   e. Dimensions (H x W x L): 141 x 159 x 449 mm (5.56 x 6.2 x 17.68 in)

3.

4. Unit Weight:
   a. Without sunshield: 1.8 Kg (4.0 lbs.)
   b. With sunshield: 3.2 Kg (7.0 lbs.)
   c. Cable Entry: 2 weatherproof glands
   d. Max. Camera/Lens Length: 304.8 mm (12.0 in)
   e. Camera Mounting: Non-metallic multi-position front to back adjustment

5.

6. Heater Kit:
   a. Type: Thermostatically controlled pad heater
   b. Supply Voltage: 24 VAC/VDC (12-30V)
   c. Power: 0.63 A maximum
   d. Weight: 68 g (0.15 lbs.)

7.

8. Blower Kit:
   a. Supply Voltage: 24 VAC

C. Environmental

1.

2. Weatherproof Standard: IP63 (NEMA-3R)

3. Operating Temperature: -23° to 43° C (-10° to 110°F) with heater/blower.

D. Regulatory

1. CE.

E. Warranty

1. Minimum two years.

PART 3 PRODUCT CATEGORY: AMERICAN DYNAMICS HYBRID DIGITAL VIDEO RECORDERS

A. The Hybrid Digital Video Recorder (HDVR) shall have Video Management System (VMS) software for viewing live and recorded video from analog and IP cameras and video encoders connected to a local and wide area network. The VMS software shall have a Client-Server based architecture that can be configured as a standalone VMS system with the Client software running on the server hardware and/or the Client running on any network connected TCP/IP PC workstation. Multiple client workstations shall be capable of simultaneously viewing live and/or recorded video from a single or multiple servers. Multiple servers shall also be able to simultaneously provide live and/or recorded video to a single or multiple workstation(s). Included in the cost of the software are an unlimited number of client software applications.

B. IP Camera and Encoder Support: The VMS software running on the HDVR shall have an open architecture supporting IP cameras and encoders from multiple manufacturers providing best of breed solutions from low cost entry level features to high resolution megapixel features. A minimum of five (5) IP camera manufacturers must be supported from leading companies such as ACTi, Arecont Vision, Axis, IQinvision, Panasonic, Sony and Vivotek.

C. VMS Client Server Architecture: The VMS software running on the HDVR shall be based on a client / server architecture. A client / server architecture provides a scalable platform, whereby each computer on a network is a client, server or both a client/server simultaneously.

D. VMS Client Software: A client is a computer system that accesses a (remote) service on another computer by a TCP/IP network. The VMS Client software displays and searches live and recorded video, audio and alarms, and administers the VMS Server configurations.

1. There shall be one VMS Client application that shall be installed in two different configurations depending on the requirements. The VMS Client shall have the same features, functions and user interface in either configuration. The first client installation configuration is referred to as a Local Client, meaning the client resides on the same system that is “local” to the server. The second installation is referred to as a Remote Client, meaning it is installed on a different computer that is “remote” from the server and is connected to the server through a local or wide area network. All interaction (viewing live or recorded video and administration) with the server shall be performed through either the Local or Remote client.
2. When configuring a server with full administrative privileges with either a Local or Remote Client all administration and configurations functions shall be identical. By having full administration and configuration features from a Remote Client, customers and installers shall save time and money by not being required to administer features where the server hardware is physically located.
3. At no time during the administration and configuration of any feature of a server from either a Local or Remote Client shall video recording be

required to be disabled.

4. The VMS Client software shall operate on any of the following operating systems:
   a. Microsoft Windows Server 2003
   b. Microsoft Windows XP (all versions)
   c. Microsoft Windows Vista (all versions)
5. Any combination of VMS Client applications running on any of the above listed operating systems shall be able to connect to view and retrieve live or recorded video from any of the HDVR Server applications running on any of the operating systems listed in 2.01 G below.

E. Client Browser: A Browser based Client shall have a feature to connect to a VMS Server to display live video. The Client Browser shall display video on a PC, Mac, Linux PC, PDA, iPhone & CEL phone using the following browsers:
   1. Internet Explorer 6, 7 or 8
   2. Firefox 2 or 3
   3. Opera 9 and above
   4. Safari 2 or 3
   5. The Client Browser shall also connect with non-Java script browsers and shall be compliant with HTML 4.0 (www.w3.org).

F. VMS Client on Multiple Monitors: The VMS software shall have the capability to run multiple client applications simultaneously on one PC workstation with multiple monitors. Up to four VGA monitors shall be configured on a single PC workstation with one client application running on each VGA monitor. As decompressing video is CPU-intensive, the PC workstation shall have multiple processors, one for each VMS client application. The HP PT453A Display Adaptor shall be used to support up to four VGA monitors. This is an NVidia Quadro-based board that shall have been tested running the VMS Client with VGA and DVI monitors up to 1920x1200 resolutions.

G. VMS Server Software: A server is a computer system that provides services to other computing systems—called clients—over a TCP/IP network. The VMS Server software shall record and retrieve video, audio and alarm data and provide it to the VMS Clients upon request. The VMS Server software running on the Hybrid DVR shall operate on Microsoft Windows XP

H. Standalone Client/Server: A client and server can simultaneously reside and operate on one computer and communicate to each other through a TCP/IP loop back interface. A loopback address is a special IP address (127.0.0.1) that is designed for the client and server software to communicate with each other on the same computer. By combining the functionality of the VMS Client and Server software on one system, administrators can deploy both standalone and network configurations that can scale required. The administrator shall have the added benefit of configuring and administering the VMS server with identical features either locally or remotely.

I. IP Camera based Motion Detection: Motion based video recording with the VMS server software shall be based on using the motion detection alarm (also known as a flag) generated by the IP camera. The motion detection feature of the IP camera shall generates an alarm whenever movement occurs in the image. The

VMS server software reads the alarm from the IP camera to determine if motion occurred then records video. The benefits of using IP camera based motion detection vs. server (host processor) based motion detection include:

1. Reduced server processor speed requirements
2. Reduced server memory requirements
3. Reduced processor heat
4. Reduced CPU processor usage
5. Increased IP camera connectivity
6. Increased IP camera throughput

J. Licensing VMS Software: The VMS server software shall have a feature to license the MAC address of the server hardware. Licensing individual IP cameras or encoders shall not be required. Licenses the server simplifies the installation and management of IP cameras or encoders by eliminating the need to provide additional MAC addresses for all the individual devices (IP cameras or encoders). If an IP camera or encoder fails to operate for any reason an administrator shall be able to add a new IP camera or encoder to the VMS server software without the need to obtain a new license key.

K. The VMS server software shall run as a service. If the VMS Client software is shut down the VMS server software service shall continue to record video and perform all other configured functions.

L. Installing and Updating VMS Client Software: Installing a new release of the VMS Client software shall be easily accessed by a website download.

M. Installing and Updating VMS Server+Client Software: New releases of the VMS Server+Client software shall be easily accessed from a website. Download the new VMS Server+Client Installer.exe file to a CD or USB key. Insert the CD or USB key to VMS hardware. Run the VMS Server+Client Installer.exe from the CD or USB key and the new VMS Server+Client software will be automatically updated. Restart the VMS Server software.

3.02 HYBRID VIDEO MANAGEMENT SYSTEM SOFTWARE FEATURES

A. Operating Modes: The VMS software shall have three main modes of operation depicted by three icons. Clicking on any of these icons below shall change the mode of operation:

1. Live Display Mode Icon allows users the ability view live video.
2. Search Mode Icon allows users the ability to search for recorded video.
3. Setup Mode Icon allows Administrators and Power Users the ability configure systems.

B. Live Display Mode Features: A live display mode shall have features for users to view live video. The live display mode shall have the following features to navigate and view live video:

1. Layout Icons – shall have features to organize the camera video view panel in the following patterns:
   a. 1 camera (full screen) layout
   b. 4 camera (2 x 2) layout

c. 9 camera (3 x 3) layout
d. 12 camera (4 x 3) layout
e. 16 camera (4 x 4) layout
f. 20 camera (5 x 4) layout
g. 30 camera (6 x 5) layout
h. 48 camera (8 x 6) layout

2. Navigation Tree – shall display cameras, alarms, monitor & audio icons that are connected to the VMS server.
3. Navigation Pane – shall display a hierarchy of cameras, audio input and serial port input icons organized by Cameras (cameras connected to servers), Groups (logical grouping of cameras) and Views (Saved live display layouts). Clicking on navigation pane bars shall switch the navigation tree into the desired navigation tree display.
4. Video View Panel – shall display video of cameras. Cameras can be dragged from the navigation tree into the view panel and live video will be displayed. If there are multiple video view panels in a layout (example: 4 camera (2 x 2) layout), video can be moved (switched) by dragging video from one view panel to another panel.
5. About Icon – shall provide information about the version number of the client software.
6. Help Icon – shall provide context sensitive documentation from the on-line user's manual specific to the screen you are viewing.
7. Show/Hide Navigation Tree Icon – expands the display by hiding the Navigation Tree.
8. Full Screen Icon – shall enlarge the video display area by hiding the title and task bars.
9. PTZ Control Icon – shall provide PTZ control which allows you to maneuver a PTZ camera.
10. Date and Time – shall display the current date and time.

C. Pan, Tilt & Zoom (PTZ) Controls: The VMS software shall control PTZ cameras and have features to maneuver both a mechanical PTZ camera and digitally pan, tilt and zoom on any video. Six methods of controlling a PTZ camera shall be available:

1. PTZ graphics control windows
2. Live graphic overlay PTZ control icons
3. PC keyboard control (Up, Down, Left, Right Arrows & Page Up / Down for Zoom In / Out)
4. PTZ Presets
5. Digital PTZ
6. USB Joystick to control PTZ cameras

D. Auto Replay of Recorded Video from Live Display Mode: The VMS software shall replay recorded video from the Live Display Mode by right clicking in the appropriate video view panel and selecting Replay. You will have the option of reviewing video in increments of 5 or 30 seconds or 1, 5, or 15 minute. Once you select the desired video replay increment, the Replay window will open and begin downloading the recorded video. A Scrub Bar will track the progress of the download. The total number of frames in the video segment as well as the number that have been downloaded will also be displayed in the status bar. If

you wish to stop the download, click the Stop Download button at the bottom of the window.

E. Virtual Matrix Switching: The VMS software shall activate virtual matrix switching by right clicking in one of the live video panels and selecting Event Monitor from a drop down dialog menu and then selecting a profile you would like to view. A Virtual Matrix switching shall automatically show video as it is triggered. For example, if you have a series of entrances, each time an entrance is triggered the video panel will switch to the camera displaying the most recent motion as it occurs. Virtual Matrix Switching shall be stopped by right clicking in the active video panel and disabling the active event monitoring profile.

F. Event Monitoring: The VMS software shall activate event monitoring by right clicking in one of the live video panels and selecting Event Monitor from a drop down dialog menu and then selecting a profile you would like to view. An Event Monitoring profile shall bring up a list of events which the user can click on to view giving you much more control. If you configured your profile for Event Monitoring mode, an Event Monitoring Box will appear just below a live video panel. You can move it and resize it as you need. Once a video event takes place, it will be automatically listed in the box. Using the same entrance example, instead of the video panel automatically switching to the camera displaying the most recent door opening, the event would be added to a list in the Event Monitoring Box. You could then click on the item to display the video. This may be useful if a guard needs to leave the monitor for a period of time. It is also helpful when you have events occurring on two cameras at the same time. Instead of seeing each event for a split second, you can view each event for as long as you need to. Event Monitoring shall be stopped by right clicking in the active video panel and disabling the active event monitoring profile.

G. Viewing Logical Camera Groups: The VMS software shall have a feature for viewing logical groups of cameras. The VMS software shall also have a feature creating camera groups (see Group Setup). This will enable you to efficiently view cameras in logical order you choose. Once you setup the camera groups, you shall select the cameras in those groups by clicking on the Group button in the Navigation Pane.

H. Creating, Saving and Accessing Views: The VMS software shall have a feature to organize your cameras into preset Views. Select a Layout button in the Live mode and drag the cameras to the appropriate spot on the Video View Panel. Once you have the cameras laid out the way you want it, select the save view feature. Once you have saved your view, you shall access it by clicking the View button from the Navigation Pane. Select your view from the Live Views Site Tree and the camera layout you saved will be recreated in the Video View Panel. The VMS software shall have the capability to create and organize your views into folders.

I. Video Tours: The VMS software shall have the capability to automatically cycle through two or more saved views to create a Video Tour. Select the desired views to add to a tour and type a description of the tour. A dwell time sets the amount of time, in seconds; each view will remain in the Video View Panel before cycling to the next view. Once you have named the tour, added the views and a

description, and selected the appropriate dwell time, click the Apply button to save the settings. The tour shall be activated by clicking on the saved tour description icon visible in the View Navigation pane.

J. Search Mode Overview: The VMS software shall have features to search for and playback recorded video, audio and events from a VMS servers. The system must also be capable of performing searches on multiple camera based on a given criteria. The VMS search software shall have the following features:

1. Input Selection Tree – select the camera(s), audio input(s) or text data to search.
2. Navigation Pane – displays cameras, video, audio, and events in organized groups and views.
3. Video Time Line – time line of video that is displayed. The video time line shall be displayed in increments of 5 minutes, 1, 8 and 24 hours.
4. Zoom In (+) and Zoom Out (-) Buttons – Zooms in and out on the video time line.
5. Camera Selection List – cameras that have been selected with the camera selection tree.
6. Video Cursor – the video cursor is used to select the segment of video you would like to playback. One click will move the video cursor to a new location. Double click will begin video playback.
7. Recorded Bar – bars that represent recorded video or audio.
8. Video Playback Controls – there shall be seven playback controls:
   a. Play video in reverse fast (double) speed
   b. Play video in reverse in normal speed
   c. Stop video play
   d. Play video forward in normal speed
   e. Play video forward in fast speed
   f. Play video forward one frame at a time
   g. Play video backward one frame at a time
9. Calendar – used to select the day of the video search
10. Start Search Time – used to change the desired time of the video search
11. Search Button – the search button initiates a new video search based on changes that have been made in the camera selection tree, calendar, and start time.
12. Video Playback Window – video window that video is played in.
13. Export Buttons – Save Picture, Save Video, Print Picture, and Burn to CD or DVD.
14. Scrub Bar & Scrub Handle – used to quickly scrub back and forth through video.
15. Stop Download Button – used to stop the down the download.

K. Multi Camera Search and Playback: In addition to searching and playing back recorded video from a single camera the VMS software shall have the capability to search for and playback multiple cameras simultaneously. All video recording shall be played back and displayed in a synchronized multi camera layout as the video was recorded. Recorded video shall be played back in the following screen layouts:

1. 4 camera (2 x 2) layout

2. 9 camera (3 x 3) layout
3. 12 camera (4 x 3) layout
4. 16 camera (4 x 4) layout
5. 20 camera (5 x 4) layout
6. 30 camera (6 x 5) layout
7. 48 camera (8 x 6) layout

L. Audio Search and Playback: The VMS software shall have a feature search and playback audio in synchronization with video.

M. Exporting Files: The VMS software shall have the capability to export video and audio files. To export a file, you must first mark the starting and ending point of the video and audio you wish to export. Once the video and audio has been marked, select the export feature. Once the VMS software has exported a video and/or audio file it shall have an option to be burned to a CD or DVD. The VMS software shall give you the option of exporting the file in the following formats:
1. Standalone Exe (*.exe) – includes an executable player with the video & audio data
2. AVI File (*.avi) – Audio Video Interleave is a multimedia container format
3. PS File (*.ps) – Program stream is a format for multiplexing video & audio

N. Copy, Save and Print Images: The VMS software shall also have features to save and print a picture (image). The VMS software shall have the capability to copy a picture to a clip board and paste it into a document. When you find the image you need, right click anywhere in the video playback window and select Copy Image to Clipboard. The image will be stored, and you can paste it into a document.

O. Standalone Player: The VMS software shall have the capability to export video and audio files with an executable Standalone Player. Double clicking on the executable Standalone Player shall start the application and open the video and/or audio files. The Standalone Player shall have the following features:
1. Screen Layouts:
   a. 1 camera – Full screen layout
   b. 4 camera (2 x 2) layout – simultaneous multi camera playback
   c. 9 camera (3 x 3) layout – simultaneous multi camera playback
   d. 16 camera (4 x 4) layout – simultaneous multi camera playback
2. Video Playback Controls – there shall be seven playback controls:
   a. Play video in reverse fast (double) speed
   b. Play video in reverse in normal speed
   c. Stop video play
   d. Play video forward in normal speed
   e. Play video forward in fast speed
   f. Play video forward one frame at a time
   g. Play video backward one frame at a time
3. Scrub Bar & Scrub Handle – used to quickly scrub back and forth through video.
4. Camera & Audio Tree – used to select video and audio for playback
5. File:

a. Open
b. Save Image
c. Copy to Clipboard
d. Save as AVI
e. Print
f. Exit

6. Options:
   a. Show Camera Name
   b. Show Timestamp
   c. Show Status Boarder
   d. Time-lapse Playback Interval
   e. Show Camera Tree
   f. Show Full Screen
   g. Font
7. Tools:
   a. Authenticate- used to verify the video hasn't been tampered with or corrupted. A keyed-Hash Message Authentication Code, or HMAC, is a type of message authentication code (MAC) calculated using a specific algorithm involving a cryptographic hash function in combination with a secret key. As with any MAC, it may be used to simultaneously verify both the data integrity and the authenticity of the data.
8. Right Click on Video:
   a. Clear this video panel
   b. Digital PTZ

P. Setup Mode Overview and Features: The VMS software shall have features for Administrators and Power Users to configure systems. A Setup Mode shall consist of a hierarchy of icons for configuring the systems also referred to as a "configuration tree". Clicking on any of the icons in the configuration tree shall take you to new screen for configuring the item you selected. The configuration tree shall consist of the following icons and features:

1. My Systems
2. Adding Systems
3. Client Setup
4. Joystick Setup
5. Event Monitoring
6. Group Setup
7. System Information
8. System Setup
9. Add IP Cameras
10. IP Camera Recording Setup
11. IP Camera Setup
12. Analog Camera Recording Setup
13. Analog Camera Setup
14. Audio Input Setup
15. Trigger Input Setup
16. Alarm Output Setup
17. Video Output Setup

18. Storage Setup
19. Serial Profile Setup
20. Serial Port Setup
21. Notifications
22. Instant Recall Setup

Q. My Systems: The VMS software shall have a feature for displaying systems that have been added to the Client software including the system names, system status (connected or not connected) the IP address of the systems, licensing status and software subscription status. If there is one standalone system (VMS Client & Server software running on the same server hardware) you will see one system listed with this feature. If you have multiple systems configured with the Adding System feature (see below) you will see the status of multiple systems.

R. Adding Systems: The VMS software shall have features to configure your client application to connect to VMS servers. Enter your VMS username, password & the IP address of the server and click apply to connect your client application to the VMS for viewing live and recorded video. Multiple VMS can be added to the system list. Client applications can connect to multiple servers simultaneously. Once a system has been added to the Systems List, the Client will automatically connect to the system. All authorized video viewing; searching and system configuration functions will be available to your client application.

S. Client Setup: The VMS software shall have features to configure your client software based on your personal preferences. Personal preferences shall include:
1. Live Video Border display status (on or off) & PTZ focus
2. VGA Acceleration options
3. Time-lapse Playback Speed
4. Configuration Icon for Restricted Users (show / don't show)
5. Event Button customization
6. Color customization display options for:
    a. Motion Recording
    b. Alarm Recording
    c. Free Run Recording
    d. PTZ Focus
    e. Event Monitoring

T. Joystick Setup: The VMS software shall have features to configure any standard USB joystick to work with your VMS Client workstation. There shall be Position Controls that can be adjusted to suit your personal preferences. The sensitivity of the joystick shall be adjusted by moving the Sensitivity slide bar to the left, making it less sensitive, or to the right, making it more sensitive. You shall also have features to alter the north and south movement of the camera or view. When the Invert Y Axis checkbox is selected, the PTZ camera view shall move north when you move your joystick down and South when you move it up. This shall be reversed by deselecting the Invert Y Axis checkbox. The camera or camera view shall zoom in or out by twisting the joystick to the right or left. You shall configure the joystick to zoom in by twisting the joystick to the right or left, depending on your personal preference. When the Invert Rudder checkbox is

selected, the camera will zoom in by twisting the joystick the left and zoom out when it is twisted to the right. Deselecting the Invert Rudder checkbox will reverse the zoom control. One or more of joystick buttons shall be programmed by using a drop down menu to select the desired setting:

1. PTZ Zoom In/Out
2. Increase/Decrease PTZ Zoom Speed
3. Increase/Decrease PTZ Pan/Tilt Speed
4. Next/Previous Video Panel
5. View This Camera Only
6. Toggle Digital PTZ
7. Traverse the Camera Tree
8. Go to PTZ Preset Number 1-16

U. Event Monitoring Setup: The VMS software shall have features to configure the VMS Client to react to events that take place in the server or servers to which it is connected. To activate the event monitoring feature, you must first create and define a new event monitoring profile. A profile shall be a set of actions (e.g. the playing of live video or an alarm sound) triggered by sources such as video motion, input triggers, etc. Each profile can then be activated and assigned to a specific video panel by the user. There shall be two types of event monitoring profiles:

1. Virtual Matrix: A Virtual Matrix profile will automatically show video as it is triggered. For example, if you have a series of entrances in one profile, each time any of the entrances is triggered, the video panel will switch to the camera displaying the most recent door motion.
2. Event Monitor: An Event Monitor profile shall bring up a list of events which the user can click on to view giving you much more control. Using the same Main Entrances profile as our example, instead of the video panel automatically switching to the camera displaying the most recent door opening, the event would be added to a list. You could then click on the item to display the video. This may be useful if a guard needs to leave the monitor for a period of time. It is also helpful when you have events occurring on two cameras at the same time. Instead of seeing each event for a split second, you can view each event for as long as you need to. Once the Event Monitoring Profiles have been created, you shall activate them in the VMS Client software.

V. Group Setup: The VMS software shall have features to create logical groups of cameras from cameras connected to a single or multiple VMS servers. The logical groups of cameras shall be displayed in the navigation tree hierarchy of cameras. The group setup featured shall be used when you have multiple VMS servers with a fairly large number of cameras spread across a large building or campus that you would like to place in logically named groups such as 1st floor, 2nd floor, and 3rd floor and so on. In this example you might have two VMS servers with 50 IP cameras each, and you have a four story building that you want to place 25 cameras on each floor. Instead of viewing your cameras as they are physically connected to your VMS server, you create four named groups consisting of 25 cameras each. It's much easier for a user to find cameras when they are located in named groups that match the logical layout of their building. In addition to monitoring live video, groups shall be used for searching video. In

the search video feature, click on the Groups navigation pane then select the group and search.

W. System Information: The VMS software shall have features for displaying system information about users that are currently logged into the system, plugin file version information number and status, and a system log. The system log shall be viewed by selecting the start and end date and time and clicking on the search button. The system log shall also be export to a file name and open with a text editor. The system log is a useful tool for viewing a detailed history of all the processes that take place on the system. A log settings feature shall give you the ability to set the maximum days that logged alarms and the system logs are kept on the system.

X. System Setup: The VMS software shall have features to setup VMS server parameters including:
   1. System Name
   2. Time and Date
   3. Time Zone
   4. Time Server
   5. Network Settings (Hostname, IP Address, Network, Gateway and DHCP status)
   6. Bandwidth Settings
   7. License Key - A license key shall be required to add the number of IP cameras needed for the system. To obtain your license key you will need to provide your network adapter hardware MAC address to the VMS software manufacturer. It is a twelve character string which can be found on the System Setup page. The VMS software manufacturer shall provide a license key needed to add IP cameras. Once you receive your license key, you shall enter it by hand in the license key edit fields, or import it from a file.
   8. Importing and Exporting System Settings - Every feature in the system that is setup and configured through the Setup Mode site tree shall have the ability to be imported or exported.

Y. Add IP Cameras: The VMS software shall have features to add IP cameras to your VMS server. Once IP cameras have been added to a list of IP cameras on your VMS server your VMS Client software shall be able to configure the IP camera settings and view live and recorded video.

Z. IP Camera Recording Setup: Once IP cameras have been added to the VMS server the VMS software shall have features to enable IP cameras to record video, set the recording resolution and set the image per second (IPS) recording rate. Each IP camera shall be individually set. If a camera has been connected to a VMS server and the camera is producing a video signal, the VMS Client software shall automatically detect the video signal. If a video signal is detected it is indicated with a video detection feature and by default a record enabled feature shall be selected. To disable recording uncheck the enable check box. The VMS software shall have features to change individual camera resolutions by clicking on a record resolution drop down menu and selecting QCIF, CIF, 2CIF, D1, VGA, 1M, 1.2M, 1.3M, 1.9M, 2M, 3.1M and 5M resolutions. Camera

resolutions shall vary depending on the IP cameras selected and added to the VMS server.

AA. IP Camera Setup: The VMS software shall have features for configuring individual IP camera settings such as camera name, on-screen display, PTZ preset settings and tours, digital PTZ presets, video settings (brightness, contrast, saturation & sharpness), recording quality, compression format (MPEG4, H.264 or JPEG), pre motion recording, crop window, motion masks (sensitivity, percentage, include & exclude) and video masks. Some of the settings shall vary depending on the type, model and features of IP camera selected and added to the VMS server.

BB. Analog Recording Camera Setup: The VMS software shall have features to enable analog cameras to record video, set the recording resolution and set the image per second (IPS) recording rate. Each camera shall be individually set. If a camera has been connected to a VMS server and the camera is producing a video signal, the VMS Client software shall automatically detect the video signal. If a video signal is detected it is indicated with a video detection feature and by default a record enabled feature shall be selected. To disable recording uncheck the enable check box. The VMS software shall have features to change individual camera resolutions by clicking on a record resolution drop down menu and selecting CIF, 2CIF and D1 resolutions.

CC. Analog Camera Setup: The VMS software shall have features for configuring individual analog camera settings such as camera name, on-screen display, PTZ preset settings and tours, digital PTZ presets, video settings (brightness, contrast, saturation & sharpness), recording quality, compression format (H.264 or JPEG), pre motion recording, crop window, motion masks (sensitivity, percentage, include & exclude) and video masks.

DD. Audio Input Setup: The VMS software shall have features for configuring audio input names and enabling audio inputs for recording. The VMS software shall install with the audio input disabled due to legal restraints on audio recording in some jurisdictions. To assign a new, logical name for the audio input channel, highlight the default name and type the new name. Enable the audio input channel by checking a record enable box. A listen feature shall allow verification of the audio input connected to a channel. Check a listen box to hear the audio for the corresponding input channel. To stop the live audio feed, deselect the listen box.

EE. Trigger Input Setup: The VMS software shall have features to configure input trigger names and to set the Normal State (NO = Normally Open and NC = Normally Closed) of the triggers. You shall assign new logical names and optionally change the Normal State from the default of NO to NC. You shall verify the proper operation of the input state by going to the Trigger Input setup screen and observing the “Status” state, which toggles back and forth between “Normal” and “Alarm”. By default the “Normal State” is set to NC (Normally Closed). If you trip a sensor by opening the door you will see the “Status” state toggle from a green ‘NORMAL” to a red “ALARM” indicating an alarm has been detected. The alarm shall be linked to an action such as recording video or triggering a relay by use of the Event Linking feature and configuring the desired

action.

FF. Alarm Output Setup: The VMS software shall have features to configure alarm output names and set the Normal State of output triggers. You shall assign new logical names and change the Normal State of the Alarm Outputs from the default of Hi (5 VDC) to Lo (0 VDC). The Status is “NORMAL” in either the Hi or Lo Normal State setting until an event from the Event Linking feature activates an ALARM status. You shall verify the proper operation of the output state by observing the “Status” state, which toggles back and forth between “Normal” and “Alarm”. By default the “Normal State” is set to Hi (5 VDC).

GG. Video Output Setup: The VMS software shall have a feature to configure security spot monitors for touring (switching) between analog camera video in full display mode. Select the cameras you would like to include in the tour by clicking on the Camera in Tour check box. When you click on the check box or camera name, video will be displayed to visually assist you to select the cameras you want to include. Slide the Dwell Time control to desired length of time before the monitor switches to the next camera. The Dwell Time range is from 1 to 60 seconds.

HH. Storage Setup: The VMS software shall have features to configure your hard drives for video storage. The VMS software shall be installed on your C: drive and separate disk drives shall be used for video storage. The video storage disk drives shall be designed for high duty cycle operation as it is likely that video will be recorded on a continual basis. Disk drives shall be visible during configuration for review and adjustment. The VMS software shall enable or disable a drive for video storage by selecting or deselecting the enabled feature during storage setup. The entire disk drive shall be used or set an upper limit by adjusting a video space slider. If the C: drive is used for video storage, set the video space at no more than 90% to reserve space for other operating system tasks. The VMS software shall have a feature to display the used space that lets you know how much of the disk drive capacity you are currently using. The VMS software shall display the status of a healthy or missing disk drive. There shall also be a feature which indicates the age of the oldest video recorded on this system. The VMS software shall have a feature to take a periodic snapshot (time lapse recording) even if the cameras are set to record upon motion or alarm. Configure to the desired time lapse increment and then select the Hours, Minutes, or Seconds feature. Selecting zero will disable this feature.

II. Serial Profile Setup: The VMS software shall have features for creating and viewing transaction profiles so character strings such as cash register receipts, ATM transactions or access control transactions can be viewed with live or recorded video. Event keyword shall trigger a system alarm or action when certain character strings is read by a serial port. Recorded video shall be searched and retrieved using a search serial feature.

JJ. Serial Port Setup: The VMS software shall have features to configure serial ports on your VMS server so that they can be used to communicate with serial devices such as point of sale (POS) terminals or pan-tilt-zoom (PTZ) cameras. Once the serial device is connected to the serial port with a cable the serial port shall be configured. The VMS software shall provide a choice for configuring the serial

port including Unused, POS (Point Of Sale), or PTZ (Pan Tilt Zoom). Generally, a POS option is used to record transactions from a cash register. The PTZ option is used to control the motion of a PTZ camera. The VMS software shall default to unused until it is configured. Once the serial port has been selected for Use, a unique name shall be assigned to the port, such as express lane. The Baud Rate, Data Bits, Stop Bits, Parity, and Flow control must match the devise you are connecting. Check the User Manual for the devise you are using to determine the appropriate settings and use the VMS feature to set your selections.

KK. Notifications: The VMS software shall have features to configure an e-mail server and message profile that will send an email message when an event occurs. Once you have configured the e-mail server and message profile you will need to go to the Event Linking feature (below) to configure the events that will cause an email message to be sent. The E-mail Server Configuration feature is where you configure the outgoing SMTP mail server that you will use to send email from the VMS server.

LL. Instant Recall Setup: The VMS software shall have a feature to export a video segment from specific cameras or audio inputs to a CD or DVD upon an input trigger or other event being activated. The software shall also send an email or text message notifying a contact that the input trigger has been activated. The VMS software shall have a feature to create a profile that will determine the number of minutes of recorded video you want to export before and after the instant recall is activated. Once the profile has been created go to the Event Linking feature (below) to link the profile to the type of event that will cause the video and audio segment to be exported.

MM. Event Linking: The VMS software shall have features to connect different types of events such as an input triggers to a desired action such as recording video or triggering an alarm. An Event <Activates> an Action and is stored in a database for you to quickly find. The reason for linking an event to an action is to create a logical relationship between your physical security devices to improve your ability to quickly search and find them when an event occurs. Event linking helps to narrow the information you are searching for. The VMS software shall have the following event types:

1. Video Motion
2. Video Loss
3. Input Trigger
4. POS Port
5. POS Profile
6. Health
7. IP Camera Connection
8. Manual Event-Soft Trigger

NN. The VMS software shall have the following action types:

1. None
2. Record Video
3. Output Trigger
4. Output Video 1

5. Notify – email & text notification
6. Instant Recall
7. PTZ Preset

OO. Pre and Post Triggers shall be used to trigger some action types before and/or after the event occurs. For example, if a door opening is set to trigger video recording, a Pre and/or Post Trigger can be set to capture the video for up to 100 seconds before and/or after the door opened.

PP. Event Buttons: The VMS software shall have a feature to assign manual events or soft triggers to event buttons. When an event button has been assigned an event such as turning on a light, the VMS software shall activate the light by manually clicking on an event button.

QQ. Schedule: To maximize the amount of storage on your VMS server, you shall schedule camera, audio and event recording based on your individual needs. For example, you may want continuous record video during business hours, but after business hours you may want your cameras to record based on motion or a specific event. The VMS software shall have a feature to configure your camera and event recording schedule. The VMS software shall ship with Motion (Blue) recording as the default schedule because this is the most common and efficient (disk saving) way to record video. The default Event schedule is shipped Enabled (Red) so that when events are setup in the Event Linking feature (above) they will automatically function once created. There shall be four modes of video recording:
1. Motion (Blue) means video is recorded when motion is detected
2. Free Run (Green) means video is continually recorded nonstop
3. Alarm (Red) means video is recorded when there is a triggering event
4. Off (White) means video is not recorded at this time

RR. There shall be four scheduling features:
1. Day – customize the recording schedule by day
2. Camera – customize the recording by camera
3. Event – enables or disables events for a particular time and day
4. Audio – customize the audio recording schedule

SS. Users Setup: The VMS software shall have features to add or delete users to and from the VMS server. The User Setup screen is also where you set a users group access level and the cameras they have access to viewing. Once a user has been added to the system he/she will have the ability to login to view live and recorded video. Adding a new user to the VMS server shall consist of creating a username, password and group access level (also known as privileges or access rights). Users shall be assigned to one of five groups that have different level of access to system features. The five group access levels are:
1. Full Admin: Has access to all features of the system
2. Power User: Has access to all features except for adding or deleting users
3. Live Only: Has access to view live video
4. Search Only: Has access to search for recorded video
5. Live + Search: Has access to view live video and search for recorded video.

3.03 HYBRID DIGITAL VIDEO RECORDER HARDWARE FEATURES

A. The HDVR server hardware shall be capable of running the Microsoft XP Pro operating system.

B. The HDVR server shall be capable of simultaneously recording, displaying and playing back digitized video from analog and IP cameras. Models shall be available with 16 and 32 analog inputs. 8 IP camera licenses shall be included in the base price of the system at no additional cost. IP camera licenses shall be expandable to 64 licenses.

C. The HDVR server shall have recording resolutions of CIF, 2CIF, and D1 and shall be user selectable for each individual analog camera attached to the server. Standard resolution and high resolution mega-pixel IP cameras shall also be selectable. H.264 or MJPEG video compression format shall be user selectable on any analog camera. Video recording shall be available at up to 30 images per second per input channel depending on IP camera type and server model selected.

D. The HDVR server shall have video outputs for spot monitors touring (switching) between analog camera video in full display modes. The HDVR Server shall be capable of recording line level audio, with synchronous video playback as well as playing live audio from any single audio channel selected.

E. Each HDVR Server shall have TTL alarm inputs, TTL alarm outputs and a relay output.

F. Each HDVR Server shall have RS485/422/232 serial port capabilities to communicate with serial devices such as point of sale (POS) terminals and automated teller machines (ATM). Once the serial device is connected to the serial port with a cable the serial port shall be configured. Transaction data shall be received from each serial device into a text database and associated with recorded video. User shall be able to search transaction data to locate the associated video.

G. Each HDVR Server shall have a RS485/422/232 serial port capable of communicating with pan-tilt-zoom (PTZ) cameras.

H. Each HDVR Server shall have a (2) 1Gbit 1000Base T RJ-45 Ethernet connection for networking to Remote PC HDVR Clients. Multiple servers shall be accessible by multiple clients located anywhere on the network. Each server shall record video, audio, and text while displaying live video or playback video. In the event that there is no client actively attached to the server, the server shall continue to record video and audio, monitor events and all other server functions.

I. Recorded video shall be triggered by built in motion detection, an external input device, or in continuous record mode. A 24x7 scheduler shall allow individual cameras to be configured in 1 hour increments as to which trigger mechanism will be utilized. Video shall be recorded to internal hard drives.

J. Each server shall have the capability of automatically exporting a predetermined

time frame of video to the internal server DVD/CD device upon an external trigger input connected to the server or by depressing a specific switch on the server. Such input shall export to the DVD/CD device a user defined amount of video and video camera source both pre and post event schedulable to the maximum capacity of the DVD/CD media selected.

K. Each server shall have the ability to link specific events in an “if-then” scenario. Linked events types shall include video motion, video loss, input trigger, POS port, POS profile, button input, and temperature. Sources of these events shall be any camera connected to the specific server. Action from these events shall include record video, record audio, enable output trigger, output video, notify (send e-mail), and output video to DVD.

L. Server hardware shall have an internal DVD/CD device that will allow the server to export video clips to the device in Standalone.Exe (*exe), AVI Files (*.avi) and PS Files (*ps) formats.

M. A Raid 5 option shall be available on the 16 channel and 32 channel units. The Raid 5 option shall be internal to the server and shall provide notification of a drive failure to the administrator.

N. Each HDVR Server shall have a watchdog system that monitors the system and automatically reboots the system should it lock-up or fail to operate.

3.04 HDVR SPECIFICATIONS AND MODEL NUMBERS

A. 16 channel (2U) Hardware Specifications:
1. Dimensions (L x W x H): (22.75” x 19.0” x 3.5”) (57.78 x 48.26 x 31.12 cm)
2. Weight: 27.0 – 32.0 lbs. (12.25 – 14.51 kg)
3. Input Voltage: 120 VAC/240VAC
4. Power Consumption: 300 watts
5. Video Standard: NTSC (30ips) or PAL (25ips)
6. Analog Video Inputs: 16
7. IP Camera Licenses: 8 (expandable to 64)
8. Analog Looping Outputs: 16
9. Analog Composite Outputs: 1 (Analog Cameras only)
10. Recording Resolution:
    a. CIF: 352 x 240
    b. 2CIF: 720 x 240
    c. D1: 720 x 480
11. Compression Format:
    a. Analog: H.264 or MJPEG by camera
    b. IP: H.264, MPEG-4, or MJPEG by camera
12. Alarm Inputs: 16 TTL inputs
13. Alarm Outputs: 8 TTL outputs
14. Relay Outputs: 1
15. Serial Connections: RS-232/422/485 PTZ port
16. NIC: (2) - 1Gbit 1000Base T RJ-45
17. USB2 Ports: 6 (2 front, 4 rear)
18. Audio Inputs: 16 audio input - RCA

19. Hard Drive Storage: 1TB, 2TB, 3TB, 4TB, 3TB RAID5
20. Monitor Output: 1 VGA (with adaptor) or 1 DVI
21. Mouse: Yes
22. Watchdog Timer: Yes
23. DVD/CD RW: Front panel access
24. Operating System: Windows XP Pro
25. Operating Temperature: 32° -95°F (0 – 35°C)
26. Relative Humidity: 10 – 85% RH (non-condensing)

B. 16 Channel (2U) Model Numbers:
1. ADHD160400: HDVR, 2U, 16 ch. Analog/ 8 ch. IP, 4 TB

3.05 CERTIFICATIONS

A. EMC
1. FCC part 15 Class A
2. EN55022:2006 +A1 :2007
3. EN61000-3 2 :2006 +A2 :2009
4. EN61000-3-3:2008
5. EN50130-4 :1995 + A1 :1998 + A2 :2003
6. ICES-003/NMB-003
7. CISPR 22

B. Safety
1. UL 60950-1 2nd Edition
2. EN 60950-1: 2006

C. Environmental
1. WEEE Directive 2002/96/EC
2. RoHS Directive 2002/95/EC
3. REACH Directive 2006/121/EC

D. 3 year parts and labor

E. Remote PC Requirements: The VMS client software shall operate on the following minimum requirements:
1. Processor: Intel® Celeron® Processor at 2 GHz or greater
2. Graphics: 1280 x 1024 x 32 bits
3. RAM: 1GB
4. NIC: 10/100/1000BASE-T Ethernet
5. Hard Disk: Minimum 80 GB drive
6. Operating Systems:
   a. Microsoft® Windows 2003 Server (or)
   b. Microsoft® Windows XP (all versions) (or)
   c. Microsoft® Windows Vista (all versions) (or)

F. Multi Monitor PC Requirements. (4 VGA monitors at up to 1920x1200 resolution). The VMS client software shall operate on the following minimum requirements:
1. Processor: Quad Core Intel® Xeon Processor E5300 (1.86GHz, 2 X 4MB L2, 1066) or greater.
2. Graphics: HP PT453A Display Adaptor

3. RAM: 2GB
4. NIC: 10/100/1000BASE-T Ethernet
5. Hard Disk: Minimum 80 GB drive
6. Operating Systems:
   a. Microsoft® Windows 2003 Server (or)
   b. Microsoft® Windows XP (all versions) (or)
   c. Microsoft® Windows Vista (all versions)

PART 4 PRODUCT CATEGORY: WIRELESS MESH INFRASTRUCTURE (A.K.A. MESH NODE OR MESH ROUTER)

4.01 FIRETIDE PRODUCT: WIRELESS MESH ROUTER HOTPORT 7000/6000 SERIES

A. General Requirements
1. The wireless mesh nodes shall be self-forming and self-healing.
2. The wireless mesh infrastructure shall provide link redundancy and high reliability.
3. The wireless mesh infrastructure shall provide distributed Ethernet switch functionality
4. The wireless mesh nodes shall be modular and not share any radios with access point functionality.
5. The wireless mesh nodes shall comply with all Ethernet transport standards.
6. The wireless mesh nodes shall be available in both indoor and outdoor models.
7. The manufacturer shall provide one year warranty on the hardware.

B. Networking Standards Supported
1. The mesh nodes shall support IEEE 802.3 Ethernet transport standards
2. The mesh nodes shall support IEEE 802.11 a,b,g,n standards on the radio
3. The mesh nodes shall support IEEE 802.1p standards for Quality of Service and traffic prioritization

C. Radio Requirements
1. The wireless mesh node shall support up to two radios dedicated for backhaul switching capability.
2. The wireless mesh nodes shall support IEEE 802.11a, 802.11b, 802.11g, 802.11N protocols.
3. In the IEEE 802.11N, the wireless mesh nodes shall be capable of 3x3 MIMO with 2 streams.
4. The wireless mesh nodes shall operate in 2.4GHz, 5GHz and the licensed 4.9 GHz band on the same hardware.
5. The wireless mesh nodes shall be FCC certified
6. The wireless mesh nodes shall support a maximum output power of 400 mW per stream.
7. The wireless mesh nodes shall support the following receive sensitivities
   a. 2.4 GHz, DSSS:
      1) 1 Mbps: -95 dBm ;

2) 11 Mbps: -88 dBm

b. 2.4 GHz, OFDM:
   1) 6 Mbps: -90 dBm;
   2) 54 Mbps: -73 dBm

c. 5 GHz, OFDM:
   1) 6 Mbps: -90 dBm;
   2) 54 Mbps: -73 dBm

8. The wireless mesh nodes shall provide ability to eliminate weak radio links in the network.
9. The wireless mesh nodes shall provide the ability to configure any channel in the specified frequency bands.
10. The wireless mesh nodes shall support Dynamic Channel Allocation for optimal RF performance.
11. The wireless mesh nodes shall support transmit power control (TPC).
12. The wireless mesh nodes shall provide software control over the two radios for different radio configurations
13. The wireless mesh node shall provide the capability to logically combine the two radios in “Bonded Mode” of operation for higher bandwidth.
14. The wireless mesh nodes shall provide the ability to recover neighbor radio nodes in different bands and frequencies.

D. Networking & Interfaces
1. The outdoor wireless mesh nodes shall support three 10/100/1000 Base-T Ethernet ports using weatherproof connectors.
2. The indoor wireless mesh nodes shall provide four (4) 10/100/1000 Base-T Ethernet switch ports using RJ45 connectors.
3. The wireless mesh nodes shall provide a mix of radio and Ethernet interfaces over the routing domain.
4. The wireless mesh nodes shall provide the ability to connect to each other over Ethernet
5. The wireless mesh nodes shall provide the ability to bridge multiple remote wireless mesh networks over IP.
6. The wireless mesh node shall provide the ability to seamlessly integrate with a backbone IP network.
7. The wireless mesh network shall be capable of providing a dynamic backup network in case of failure in the wired network
8. The wireless mesh shall support up to 4094 VLAN
9. The wireless mesh networks shall support configuration of static routes.
10. The wireless mesh network shall support the ability to eliminate weak links.
11. The wireless mesh network shall support multicast capabilities

E. Throughput Requirements: Subject to deployment conditions, like topography and environment etc.
1. The wireless mesh node shall support up to 400 Mbps throughput in a bonded mode of operation in MIMO configuration.
2. The wireless mesh node shall support up to 200 Mbps sustained throughput across multiple hops within the MIMO mesh.
3. The wireless mesh solution should support sustained throughput performance for 10 hops or more.

4. The wireless mesh node shall support low latency of the order of 1.5 ms (average) per hop.

F. QoS Requirements
1. The wireless mesh network shall have simultaneous support for video, voice and data multi services.
2. The wireless mesh nodes shall support port based QoS and 802.1p standards based QoS.
3. The wireless mesh nodes shall support VLANs and VLAN trunking.
4. The wireless mesh nodes shall provide load balancing on alternate routing paths between source and destination MAC.

G. Management Requirements
1. The management system shall support a single point interface for full FCAPS capabilities for all Firetide mesh elements. (incl. HotPort, HotPoint and HotClient)
2. The wireless mesh nodes shall provide management interfaces via HTTP, SNMP, GUI.
3. The management architecture shall be client-server architecture with multiple clients logging into the server.
4. The management station shall provide statistics and alarms and events.
5. The hardware shall provide system status LEDs for power, mesh, faults.
6. The wireless mesh node shall support remote software upgrade ability.
7. The wireless mesh node shall support telnet access.
8. The wireless mesh shall support advanced tools like Antenna Alignment Tool, Power Meter, Channel Usage meter etc.

H. Security Specifications
1. The wireless mesh nodes shall support user name and password security for all networking interfaces.
2. The wireless mesh nodes shall support hardware based encryption.
3. The wireless mesh nodes shall have the capability to distinguish between radios that are part of their network from radios that are not.
4. The wireless mesh nodes shall support manufacturing based digital certificates on each node that authenticates with the network.
5. The digital certificate mechanism shall have the ability to have user defined / signed certificates.
6. The wireless mesh nodes shall have digitally signed firmware files.
7. The wireless mesh nodes shall have the ability to lockout malicious users as they try to access the network.
8. The wireless mesh nodes shall support 256-bit AES, 40/104 bit WEP.
9. The security encryption standards on the wireless mesh nodes shall be FIPS certifiable.
10. The wireless mesh nodes shall support ESSID encryption.
11. The wireless mesh nodes shall support MAC address filtering.
12. The wireless mesh nodes shall support broadcast rate limiting.
13. The wireless mesh nodes shall support the ability to remotely control the Ethernet ports
14. The hardware shall provide for physical security via a lockable mounting bracket.

I. Scalability Requirements
   1. The wireless mesh nodes shall support mesh networks of up to 1000 nodes.
   2. The wireless mesh networks shall provide the ability to have Ethernet interfaces as part of the routing domain to make use of the wire where it is available.
   3. The wireless mesh nodes shall provide the ability to bridge multiple wireless mesh networks over IP.
   4. The wireless mesh nodes shall support multiple gateway interfaces for large networks and increased throughput.

J. Mobility Requirements
   1. The wireless mesh shall support mesh node mobility at high speeds with low handoff times between roaming nodes.
   2. The wireless mesh networks shall support mobility for 802.11-clients across multiple Layer 3 domains.
   3. The mesh network shall maintain session-persistent connections while mobile infrastructure nodes move at speeds of about 90 MPH (145 Kmph).

K. Power Requirements
   1. All wireless hardware units shall support 90–240 VAC, 50/60 Hz, 0.9A or 12 V DC+/- 15%
   2. The outdoor wireless mesh nodes shall support DC pass through on the Ethernet connectors.
   3. The outdoor wireless mesh nodes shall support 802.3af PoE standard (PS: Power Source) and be able to power two devices that are capable of deriving power over Ethernet.

L. Physical & Environmental Requirements
   1. The wireless mesh nodes enclosure shall be rugged NEMA 4X/IP67 rated for outdoor deployments.
   2. The wireless mesh nodes shall support optional surge suppression protection.
   3. The wireless mesh nodes shall be plenum rated for indoor use.
   4. The outdoor mesh nodes shall have weather proof antenna connectors.
   5. The outdoor devices shall be pole and/or wall mountable (with low profile mounting).
   6. The outdoor mesh nodes shall provide an optional sunshield for environmental protection.
   7. The indoor devices shall be ceiling, or wall mountable.
   8. The wireless mesh nodes shall be ROHS & WEEE compliant.
   9. The outdoor units shall have the following environmental specifications:
      a. Operating temperature: -40ºC to +60ºC.
      b. Storage temperature: -40ºC to +85ºC
      c. Humidity (non-condensing) - 10% to 90%
      d. Storage humidity (non-condensing) - 5% to 95%
      e. Maximum altitude 15,000 feet (4600 meters)
   10. The indoor units shall comply with the following specifications:
      a. Operating temperature: 0ºC to +60ºC

b. Storage temperature: -20ºC to +70ºC
c. Humidity (non-condensing) - 10% to 90%
d. Storage humidity (non-condensing) - 5% to 95%
e. Maximum altitude 15,000 feet (4600 meters)

M. Material List and Scope of Work

1. Equipment Listing to include but not limited to:
2. Contractor is responsible to field verify required quantities.
3. Ground Storage Facility: 1015 North Bixby Road—Scope of Work: Provide and install American Dynamics camera in an exterior housing at the ground storage facility. Provide and install a wireless mesh node and 40 degree antenna to transmit wireless video from ground storage facility to power plant.

a.	1—7020	Firetide HotPort Wireless Node
b.	1—AP40-50-MIMO-19	40 degree Patch Antenna
c.	1—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	1—ADCi400-D022	Illustra 400 Dome Camera
g.	1—ADCIM4PENDCAPW	Dome Pendant Cap
h.	1—ADLOMARM	Gooseneck Mounting Arm
i.	1—WPTV144175UL	Camera Power Supply
j.	1—IP PWR1	Surge Protection

4. Water Tower: 1009 North Bixby Road—Scope of work: Provide and install American Dynamics camera in an exterior housing on the city water tower. Provide and install a Firetide wireless mesh node and 40 degree antenna to transmit wireless video from water tower to power plant.

a.	1—7020	Firetide HotPort Wireless Node
b.	2—AP40-50-MIMO-19	40 degree Patch Antenna
c.	2—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	1—ADCi400-D022	Illustra 400 Dome Camera
g.	1—ADCIM4PENDCAPW	Dome Pendant Cap
h.	1—ADLOMARM	Gooseneck Mounting Arm
i.	1—WPTV144175UL	Camera Power Supply

5. Power Plant: Scope of work: Provide and install a wireless mesh node and 40 degree antenna to send and receive wireless video from water tower and ground storage facility.

a.	1—7020	Firetide HotPort Wireless Node
b.	2—AP40-50-MIMO-19	40 degree Patch Antenna
c.	2—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License

6. Water Tower: 601 S. State Street—Scope of work: Provide and install

American Dynamics camera in an exterior housing on the city water tower. Provide and install a wireless mesh node 40 degree antenna to send and receive wireless video from water tower at 215 7th St. and transmit wireless video from water both towers to head end location at the water treatment facility

a.	1—7020	Firetide HotPort Wireless Node
b.	2—AP40-50-MIMO-19	40 degree Patch Antenna
c.	2—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	1—ADCi400-D022	Illustra 400 Dome Camera
g.	1—ADCIM4PENDCAPW	Dome Pendant Cap
h.	1—ADLOMARM	Gooseneck Mounting Arm
i.	1—WPTV144175UL	Camera Power Supply

7. Water Tower: 215 7th Street—Scope of work: Provide and install American Dynamics camera in an exterior housing on the city water tower. Provide and install a wireless mesh node and 40 degree antenna to send and receive wireless video

a.	1—7020	Firetide HotPort Wireless Node
b.	2—AP40-50-MIMO-19	40 degree Patch Antenna
c.	2—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	1—ADCi400-D022	Illustra 400 Dome Camera
g.	1—ADCIM4PENDCAPW	Dome Pendant Cap
h.	1—ADLOMARM	Gooseneck Mounting Arm
i.	1—WPTV144175UL	Camera Power Supply

8. Intake—Scope of work: Provide and install American Dynamics cameras in exterior housings on the raw water intake building. Provide a hardened switch in an enclosure where each camera will terminate. Provide and install a wireless mesh node and 40 degree antenna to transmit wireless video from four cameras to the head end location at the water treatment facility.

a.	1—7020	Firetide HotPort Wireless Node
b.	1—AP40-50-MIMO-19	40 degree Patch Antenna
c.	1—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	4—ADCi400-D022	Illustra 400 Dome Camera
g.	4—ADCIM4PENDCAPW	Dome Pendant Cap
h.	4—ADLOMARM	Gooseneck Mounting Arm
i.	1—WPTV144175UL	Camera Power Supply
j.	4—IP PWR1	Surge Protection
k.	1—CNGE3FE7MSI	Managed Hardened Switch
l.	1—BN4080603	Weatherproof enclosure

9. Water Treatment Plant—Scope of work: Provide and install a Firetide wireless mesh node and 40 degree antennas to send and receive

wireless video from water towers and raw intake building. Provide and install American Dynamics fixed IP cameras at the water treatment plant with appropriate switch to bring wireless video and IP cameras to one local video recording device located in the water treatment plant. Provide and install an American Dynamics HDVR video recorder in a wall mounted cabinet capable of providing sufficient recording duration based on the camera resolution and frame rate. All cameras, wireless network nodes and power supplies shall be installed by subcontract labor using weather resistant fittings and fasteners. All cabling shall be installed in rigid conduit. Camera power shall be installed in a weather resistant enclosure. All camera and network equipment shall be installed according to manufacturer's requirements. Cameras will be positioned and focused per end user directions. One additional time will be allotted for repositioning and focusing after the system is operational and before project closeout. Video surveillance system shall be capable of integration with Kantech Access Control system.

a.	1—7020	Firetide HotPort Wireless Node
b.	2—AP40-50-MIMO-19	40 degree Patch Antenna
c.	2—AWSMIMOL240	8' Low Loss Antenna Cable
d.	1—7000-MIMO	7000 Series MIMO License
e.	1—SW-7000-RADIO-1	Firetide 7000 Series Radio License
f.	5—ADCi400-D022	Illustra 400 Dome Camera
g.	5—ADCIM4PENDCAPW	Dome Pendant Cap
h.	5—ADLOMARM	Gooseneck Mounting Arm
i.	2—WPTV144175UL	Camera Power Supply
j.	5—IP PWR1	Surge Protection
k.	1—CNGE3FE7MSI	Managed Hardened Switch
l.	1—3000-9000-ELE	Firetide HotView ProMesh License
m.	1—ADHD160400:	HDVR, 2U, 16 Analog/ 8 IP, 4 TB
n.	6—ADSHIP01	Single IP Camera License
o.	1—DLBX	Middle Atlantic Wall Cabinet
p.	1—Workstation	CCTV Client Workstation

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DIVISION 11 – EQUIPMENT

SECTION 11 85 21– DOOR INTERCOM SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Integrated security and communication system.

1.2 RELATED SECTIONS

A. Division 26 - Basic Electrical Materials and Methods.

1.3 REFERENCES

A. American National Standards Institute (ANSI/TIA/EIA) 568 - Commercial Building Telecommunications Cabling Standard.

B. International Organization for Standards (ISO) 9001:2000 - Quality Management Systems - Requirements.

1.4 SYSTEM DESCRIPTION

A. Components:
   1. Door stations.
   2. Master Stations: Connect a maximum of seven 16-call add-on selectors Model AX-16SW.
   3. Central Exchange Units (CEU): Connect a maximum of 3 add-on exchange units Model AX-320C.
   4. Power supply.
   5. Other External Connections:
      a. Access control system.
      b. CCTV system.
      c. CO line adaptor.
      d. Video output.
      e. PC.

B. Capacities:
   1. Door Stations: Maximum 120 stations with 1 CEU Model AX-248C and 3 add-on exchange units Model AX-320C.
   2. Master Stations:
      a. Maximum 4 stations with CEU Model AX-084C.
      b. Maximum 8 stations with CEU Model AX-248C.
   3. Power Supply:
      a. Model PS-2420UL: 24 V DC, 2 A.
      b. For Audio: 1.
      c. For Video: 2.

4. Number of Talk Paths: 2.
5. Number of Video Paths: 2.
6. All Call: 1, to master stations only.
7. Video Monitor: 2, same as talk paths and video paths.
8. Scan Monitor: 1.

C. Calling Master Station from Door Station and Communicating:
1. Priority Levels for Calls from Door Stations:
   a. Normal.
   b. Priority.
2. Press door station CALL button.
3. Calling tone rings on master station (for normal call, intermittent tremolo sound; for priority call, rapid intermittent tremolo sound) and selector button LED for individual door station flashes (double-flash for priority call). If door station has camera, video from door station shall be displayed on master station monitor. Call tone continues to ring until answered or is timed out (based on setting). You can stop calling tone by pressing OFF button.
4. If you press individual door station selector button, LED stops flashing and stays lit and you can talk hands-free to that station. If only TALK button is pressed to answer call, hands-free communication initiates with door station at highest priority call. Talk LED lights when you talk and goes off as you listen to caller.
5. Press OFF button again to end communication. Call also ends automatically when set talk limit is reached.
6. If you hold down TALK button for a minimum of 1 second, communication switches to press-to-talk mode. Hold down TALK button to talk and release to listen to caller. You cannot switch back from press-to-talk communication to hands-free communication.
7. If other master station presses selector button of in-use door station or in-use master station, busy signal is heard at master station.
8. Microphone is muted while you hold down privacy button on master station while in communication.
9. You can connect footswitch and use it the same manner as TALK button.
10. Master station can display calls up to 8 stations at the same time. If there are more than 8 incoming calls, they will be displayed in order of priority and time of call.
11. You can adjust calling tone, transmit volume, and receive volume with volume controls at bottom of master station.
12. You can use a headset (not included in system) instead of built-in master station's speaker and microphone.

D. Calling Master Station from Another Master Station and Communicating:
1. Press individual selector button of master station.
2. Pre-tone sounds both master stations and starts hands-free communication. Talk LED lights when you talk and goes off as you listen to caller.
3. Press OFF button to end communication. You can end call from either master station. Call also ends automatically when set communication end time is reached.
4. If called master station has privacy mode set (privacy settings button is lit),

communication is only 1-way, from calling master station to called master station, and nothing can be heard from called master side. Press TALK button on called master station for a minimum of 1 second. Press-to-talk communication starts. Hold down TALK button to talk and release to listen to caller.

5. You cannot call master station while it is communicating. You will hear a busy signal.

E. Privacy (PRIV) Function:
   1. To make master into privacy mode (prevent monitoring from other stations), press privacy button (LED lights up).
   2. To cancel privacy mode, press privacy button again (LED goes out).
   3. Privacy setting cannot be changed while in communication.

F. CO Line Call from Door Station and Communication:
   1. If CALL button is pressed at door station while CO Transfer feature is set (with CO Transfer button lit), call tone rings on master station (for normal call, intermittent tremolo sound; for priority call, rapid intermittent tremolo sound) and selector button LED for individual door station flashes (double-flash for priority call). At same time, telephone call is placed to programmed CO line number.
   2. You can communicate with door station from telephone.
   3. You can end communication at telephone. Communication also ends automatically when set talk time limit is reached. About 10 seconds before end of call, you will hear alarm sound on telephone.
   4. Maximum duration for CO line call is 300 seconds, even if call timer is set to "Infinite".
   5. Using this function requires Viking Electronics, Inc. "K-1900-5 Hot-Line Pulse Dialer".
   6. If there are multiple calls, call from door station with highest call priority is transferred.
   7. Answering at any master station during CO transfer feature will stop CO transfer.
   8. There are no functions, such as for door release and dial-in, from telephone.

G. All Call (Normal Master Station Paging):
   1. When you press ALL CALL button on master station, all individual master station selector button LEDs flash slowly. You can clear undesired master station from All Call by pressing individual master station selector button with flashing LED, which will turn off LED. Pressing that button again makes that master station part of All Call again and makes LED flash.
   2. If you press TALK button, send LED lights up and all individual master station selector buttons stop flashing and stay lit. Pre-tone sounds on target master stations and they can be talked to. At this time, you cannot hear audio from other master stations.
   3. Press OFF button to end. You can end call for individual master station by pressing its OFF button.
   4. All Call announcements do not go to master stations that are in use.
   5. During All Call, if you press individual master station selector button on calling master station or press individual master station selector button or TALK

button on 1 of the other master stations, communications switch to hands-free between master stations.

6. There is no function for hands-free reply from called master station during All Call mode.
7. If you press down ALL CALL button but do not start talking within 30 seconds, system goes back to standby mode. You can also return to standby by pressing OFF button.

H. All Call (Priority Master Station Paging):
   1. When you press ALL CALL button on master station, all individual master station selector button LEDs flash slowly.
   2. If you press ALL CALL button again, flash rate increases. You can clear undesired master station from All Call by pressing individual master station selector button with flashing LED, which will turn off LED. Pressing that button again makes that master station part of All Call again and makes LED flash.
   3. If you press TALK button, TALK LED lights up and all individual master station selector buttons stop flashing and stay lit. Pre-tone sounds on all master stations and all can be called. At this time, you cannot hear audio from other master stations.
   4. Press OFF button to end. You can end call for individual master station by pressing its OFF button.
   5. Communication of master station being used is cancelled and All Call takes priority. Before communication of master station being used is cancelled, you hear cancel warning sound.
   6. During All Call, if you press an individual master station selector button on calling master station or press individual master station selector button or TALK button on one of the other master stations, communications switch to hands-free between those two master stations.
   7. There is no function for talk back from master station receiving an All Call announcement.
   8. If you press down ALL CALL button but do not start talking within 30 seconds, system goes back to standby mode. You can also return to standby by pressing OFF button.

I. Monitor:
   1. If you press individual door station selector button, you can hear audio and if that door station has a camera, you can see image.
   2. Press OFF button to end. Call also ends automatically when set communication end time is reached.
   3. While door station is communicating with or monitored by a master station, you cannot monitor that door station from another master station.
   4. If you press TALK button while monitoring, hands-free communication mode starts with that door station.

J. Scan Monitor:
   1. When scan monitor button is pressed, door stations that have been enabled for "Scan Monitor" in programming can be monitored sequentially for a specified time interval (configured in programming).
   2. Monitoring always initiates from target door station with lowest number.
   3. If you press scan monitor button while individually monitoring target door

station, monitoring starts with the next door station in line.

4. If you press scan monitor button while monitoring non-target door station, monitoring starts with the first door station enabled for scan monitoring.
5. Press OFF button to end.
6. Communication/video channel 2 is always used for scan monitoring. During scan monitoring, video signal is always outputted from video output port 2 (V2). Scan monitoring is not possible when communication/video channel 2 is being used, even if busy LED is not illuminated.
7. Only one master station at a time can perform scan monitoring.
8. If you press TALK button during scan monitoring, hands-free communication mode starts with that door station.
9. If you press individual door station selector button or scan monitor button during scan monitoring, monitoring switches to monitoring individual door station.
10. If master station receives call from door station during scan monitoring, scan monitor function ends automatically and shall be restarted manually.
11. Scan monitoring continues without limit until it is cancelled, but master station LCD monitor goes out after 10 minutes. Outside video output continues even with LCD off. If you press scan monitor button with LCD off, LCD lights up again.
12. If you press TALK button during scan monitoring, communication mode starts with door station being monitored.

K. Activating Door Release:

1. Press door release button during communication or monitoring with door station.
2. Door release function will be activated, releasing door lock.
3. You cannot operate door from outside telephone.
4. LED stays lit while door release function is activated.
5. Door release contacts can be set to Normally Open or Normally Closed via program configuration.

L. Priority:

1. Calls have priority based on the time the call was initiated. (Earlier call has priority over later call).
2. Communication Priority, from Highest to Lowest:
   a. Door station, telephone line communication.
   b. Priority All Call.
   c. Door station to master station communication.
   d. Master station to master station communication.
   e. Normal All Call.
   f. Monitor.
   g. Scan monitor.

1.5 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Submit the following:
1. Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
2. Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

D. Installation and Operation Manuals:
1. Submit manufacturer's installation and operation manual, including operation instructions and component wiring diagrams.
2. Provide detailed information required for Owner to properly operate equipment.

E. Warranty: Submit manufacturer's standard warranty.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: ISO 9001:2000 certified company.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Aiphone Corp., which is located at: 1700 130th Ave. N. E. ; Bellevue, WA 98005; Toll Free Tel: 800-692-0200; Tel: 425-455-0510;

2.2 SECURITY AND COMMUNICATION SYSTEM

A. Integrated Security and Communication System: Aiphone "AX Series".
   1. Power Source:
      a. 24 V DC, 2 A.
      b. Two PS-2420UL (110 V AC) per video system. One PS-2420UL (110 V AC) per audio system.
   2. Door Station Calling:
      a. Tremolo call tone programmable from 10 to 600 seconds or infinite.
      b. LCD monitor remains on for duration of call-in and communication up to a maximum of 10 minutes.
   3. Master Station Calling: Select station to call, pre-tone sounds, then speak hands-free or push-to-talk.
   4. Communication:
      a. Auto: VOX.
      b. Manual: Press-to-talk, release-to-listen.
   5. Camera: CCD 250,000 pixels.
   6. Video Monitor:
      a. 3.5-inch direct view TFT color LCD.
      b. Scanning Lines: 525.
   7. Door Release: N/O or N/C, programmable per station.
   8. Door Release Contact: 24 V AC/DC, 0.5 A.
   9. Wiring: CAT-5e UTP-4 homerun from each station to CEU.
   10. Distance:
      a. Door Station to CEU: 980 feet maximum.
      b. Master Station to CEU: 980 feet maximum.
   11. CO Line Transfer Adaptor: Viking Electronics, Inc. "K-1900-5 Hot-Line Pulse Dialer".

B. Central Exchange Unit:
   1. Central Exchange Unit: Model AX-084C.
      a. Connect: Maximum of 4 master stations and 8 door stations.
      b. Current Consumption:
         1) Video: 620 mA maximum.
         2) Audio: 650 mA maximum.
      c. Video Output:
         1) NTSC standard 1 Vpp (0.7 to 1.4 Vpp).
         2) Two BNC.
      d. Video Output Trigger:
         1) Open collector output.
         2) 24 V DC, 30 mA.
         3) Two RJ-45.

C. Master Stations:
1. Master Stations: Audio/Color Video Model AX-8MV.
a. CAT-5e homerun wired to CEU.
b. Buttons:
1) 8 individual door station selector buttons with LED.
2) 8 individual master station selector buttons with LED.
3) Door release button with LED.
4) Scan monitor button with LED.
5) CO line transfer button with LED.
6) Privacy button with LED.
7) Oversized TALK button with LED to activate VOX or PTT style communication.
8) ALL CALL button.
9) OFF button.
c. Occupied LED.
d. Speaker.
e. Microphone.
f. Volume Controls:
1) Receive Switch: Low, medium, high.
2) Transmit Switch: Low, medium, high.
3) Call tone.
g. LCD brightness control.
h. Jacks:
1) Headset receiver.
2) Headset microphone.
i. Headset Volume Controls:
1) Receiver.
2) Microphone.
j. Directory Cards and Covers:
1) Master station.
2) Door station.
k. Reset switch.
l. RJ-45 jack for connection to CEU.
m. Connector for add-on selector on master station.
n. Door call-in indicator.
o. Hands-free or push-to-talk communication.
p. All Call to master stations.
q. Scan monitoring.
r. Selective door release.
s. Privacy and mute functions.
t. Wall or desk mount. Metal bracket included for wall mounting.
u. Multi-Pin Connector:
1) Video output from master station.
2) External signaling of call tones (through IER-2 or activation of TAR-3).
3) Footswitch activation for TALK function.
v. Operating Temperature: 32 degrees F to 104 degrees F (0 degrees C to 40 degrees C).
w. Monitor: 3.5-inch (89 mm) color LCD, master station Model AX-8MV.

x. Outside Video Output: NTSC standard 1 Vpp (0.7 to 1.4 Vpp), master station Model AX-8MV.

D. Door Stations:
1. Fixed Color Video Door Station: Model AX-DV.
a. Faceplate: Aluminum die cast.
b. Surface mount.
c. Call Button: Metal.
d. Camera.
e. Camera Protection: Clear Lexan lens cover.
f. RJ-45 jack.
g. Speaker.
h. Microphone.
i. Directory card.
j. White Illumination LEDs: Automatically turn on in low-light conditions.
k. CAT-5e homerun wired to CEU.
l. Operating Temperature: 14 degrees F to 140 degrees F (minus 10 degrees C to 60 degrees C).
m. Vandal resistant.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive integrated security and communication system.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Install integrated security and communication system in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Mount equipment plumb, level, square, and secure.

C. CAT-5e Cables:
1. Run cables from and homerun to one central location where CEU will be installed.
2. Maximum Cable Runs: Keep each cable run to a maximum of 980 feet (300 m) from communication device to CEU.
3. Maintain twists of cable pairs to point of termination or no more than 0.5 inch (13 mm) untwisted.
4. Do not remove more than 1 inch (25 mm) of jacket when terminating cables.
5. Cable Bends:
a. Make gradual bends of cable, where necessary.
b. Do not make bends of cable sharper than 1 inch (25 mm) radius.

c. Do not allow cable to be sharply bent or kinked at any time.

6. Cable Ties: Dress cables neatly with cable ties using low to moderate pressure.
7. Cross-connect cables, where necessary, using CAT-5e rated punch blocks and components.
8. Do not splice or bridge cables.
9. Cable Pulling:
   a. Pull cable with low to moderate force.
   b. Do not use oil or other lubricants not specifically designed for cable pulling.
10. Keep cables as far away from potential sources of EMI as possible.
11. Do not tie cables to electrical conduits or lay cables on electrical fixtures.
12. Cable Supports:
   a. Install proper cable supports a maximum of 5 feet (1524 mm) apart.
   b. Do not support cables by ceiling tiles.
13. Label Cable Termination Points: Use unique number for each cable segment.
14. Testing Cables: Test installed cable segments with cable tester.
15. Jacks: Install jacks to prevent dust and other contaminants from settling on contacts.
16. Cable Slack:
   a. Leave extra slack on cables, neatly coiled-up in ceiling or nearest concealed place.
   b. Leave a minimum of 1 foot (305 mm) of cable slack at door station side and a minimum of 10 feet 3048 mm) of cable slack at CEU side.
17. Do not install cables taught.
18. Grommets: Protect cables with grommets where passing through metal studs or other items that could damage cables.
19. Do not mix TIA/EIA 568A and 568B wiring on same installation. Use TIA/EIA 568B wiring throughout installation.
20. Staples:
   a. Do not use staples that crimp cables tightly.
   b. Do not use T-18 and T-25 cable staples.
21. Use firestop cables that penetrate firewalls.
22. Use plenum-rated cables where mandated.

3.3 ADJUSTING

A. Adjust integrated security and communication system for proper operation in accordance with manufacturer's instructions.

3.4 DEMONSTRATION AND TRAINING

A. Demonstration:
   1. Demonstrate that integrated security and communication system functions properly.
   2. Perform demonstration at final system inspection by qualified representative of manufacturer.

B. Instruction and Training:
   1. Provide instruction and training of Owner's personnel as required for operation

of integrated security and communication system.

2. Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
3. Provide instruction and training by qualified representative of manufacturer.

3.5 PROTECTION

A. Protect installed integrated security and communication system from damage during construction.

1.Equipment Listing to include but not limited to:

2.Contractor is responsible to field verify required quantities:

B.Material shall be confirmed

Qty	Model	Description
1	AX-8MV	AUDIO VIDEO MASTER STATION
1	AX-084C	CENTRAL EXCHANGE UNIT FOR 8 DOORS AND 4 MASTERS
3	AX-DV	AUDIO VIDEO SURFACE MOUNT DOOR STATION
2	PS-2420UL	24V DC, 2A POWER SUPPLY (110 VAC)

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DIVISION 26 – ELECTRICAL

SECTION 26 43 13 – TVSS-TYPE SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.21 SUMMARY

A. This section describes the materials and installation requirements for Transient Voltage Surge Suppressors (TVSS) as shown on the drawings and herein specified.

B. Related Work:
1. Section 26 05 00 – Common Work Results for Electrical
2. Section 26 20 00 – Low Voltage Electrical Transmission
3. Section 26 24 19 – Starters and Motor Control

1.02 REFERENCES AND QUALITY ASSURANCE:

A. IEEE C62.41-1991 and C62.45-1992

B. National Electrical Manufacturers Association (NEMA LS1)

C. National Fire Protection Association (NFPA 70)

D. Underwriters' Laboratories (UL 1449 and 1283)

1.03 SUBMITTALS

A. For each TVSS device indicated:
1. Product Data Sheets in NEMA LS-1 format - Publication for Low Voltage Surge Protection Devices (SPDs).
2. Installation and Operating Instructions.
3. UL 1449 Edition 2 Listing Certificate.
4. UL 1449 Edition 2 Suppressed Voltage Ratings.
5. Independent let-through voltage test results to ANSI IEEE C62.41 Cat A3 Ringwave, B3 and C3 Combination waves (For service entrance SPDs).
6. Independent test report showing product meets manufactures claimed single shot surge rating (For service entrance SPDs).

1.04 MANUFACTURES QUALIFICATIONS

A. Manufacturers shall be ISO9000 certified.

B. Manufacturers shall have been engaged in the design and manufacturing of such devices for at least ten (10) years.

C. The following manufacturers will be approved, provided they meet all specifications:
   1. ERICO Inc.
   2. Eaton equivalent
   3. Square D equivalent
   4. Siemens equivalent
   5. Or prior-approved equal.

1.05 WARRANTY

A. The manufacture shall warrant the TVSS against defects in material and workmanship for period of 10 years.

PART 2 PRODUCTS

2.01 SERVICE ENTRANCES 400A OR LARGER (MAIN SWITCHGEAR, MCC, MAIN BREAKER OR DISTRIBUTION PANEL)

A. Hard-wired MOV type surge arresters, surge capacitors and a separate TVSS-type SPD system shall be installed at all AC service entrances of each building and/or as otherwise shown on the drawings.

B. TVSS shall be listed to UL 1449 Edition 2 and cUL.

C. TVSS shall be constructed with replaceable modules. However, they shall not utilize pluggable connection, due to the possibility of such devices to “weld” in place at higher surge currents.

D. TVSS shall include L-N and N-G modes of protection. For Delta power systems only L-L protection modes are to be provided.

E. TVSS shall incorporate 200kA 8/20µs aggregate MOV material per phase.

F. Independent certification shall be provided proving that the TVSS meets a single shot surge rating of at least 100kA 8/20µs per mode, without failure of the fuse, disconnect or surge module. Bypassing of fusing/disconnects for purpose of this test is not acceptable.

G. Each mode of the TVSS shall be rated to exceed the life cycle testing of ANSI/IEEE C62.45 by withstand of at least 10,000 operations at 3kA 8/20µs without failure.

H. TVSS shall be internally line fused and be UL Listed for use on circuits with short circuit fault currents of up to 200 kAIC. These fuses to be field replaceable with indication to warn if fuse has ruptured. Unit shall not require external fuses/breaker for connection.

I. TVSS shall be capable of withstanding **multiple** temporary over-voltages per UL 1449 Ed 2 Section 36 & 37 without failure or need to reset or replace modules/fuses.

J. For safety TVSS shall have a maximum continuous operating voltage (MCOV) of at least:

Power System	MCOV (L-N)
Single phase (3W+G) 120/240 WYE	170V
Three phase (4W+G) 120/208 WYE	170V
Three phase (4W+G) 220/380 WYE	400V
Three phase (4W+G) 277/480 WYE	400V
Three phase (4W+G) 347/600 WYE	485V
Three phase (3W +/-G) 240V Delta	400V L-L
Three phase (3W +/-G) 480V Delta	485V L-L

K. The following clamping voltages (L-N) shall not be exceeded by the TVSS:

Impulse standard	Voltage rating				
	120/240 V	120/208 V	220/380 V	277/480 V	240V Delta
UL 1449 Edition 2 SVR	400V	400V	700V	700V	700V
ANSI/IEEE C62.41 Cat B3 3kA	<650V	<650V	<1000V	<1000V	<1000V
ANSI/IEEE C62.41 Cat C3 10kA	<1400V	<1400V	<1800V	<1800V	<1800V

L. The status of the each individual mode of protection shall be continuously monitored and surge capacity displayed in 20% increments. A reduction in capacity below the manufacturer's predetermined level shall operate an alarm contact.

M. The enclosure shall be NEMA 4 rated.

N. A mechanical non-resettable surge counter shall be included within the TVSS.

O. The TVSS shall have a dry alarm contact for alarm of SPD failure.

P. Acceptable Manufacturers
1. Erico TDX200
2. Eaton equivalent
3. Square D equivalent
4. Siemens equivalent
5. Or prior-approved equivalent

PART 3 EXECUTION

3.01 INSTALLATION

A. Install TVSS, surge arresters and surge capacitors as indicated on Drawings, and in full accordance with manufacturer's written instructions and comply with all applicable codes.

B. Units shall be installed with minimal connection lead length.

END OF SECTION

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

SECTION 28 13 00 – INTEGRATED DOOR ACCESS CONTROL

PART 1 GENERAL

1.1 GENERAL DESCRIPTION

The Security Management System (SMS) shall be a modular secure access management system used to better control employee and visitor movements at various establishments. The SMS shall be designed to maximize all tools offered by the Windows platform. All commands shall be accessible using only a mouse, and keyboard use shall be limited to documenting fields requiring numeric or alphanumeric data.

The operating program shall be multi-user and multi-task and capable of running on a non-proprietary CPU. The application software shall be based on a standard, high level programming language. The SMS shall be modular to facilitate its installation and the development of its capabilities while avoiding major modifications in its operation and in saving all defined system and historical data.

The server shall be a database server for a Paradox database. All database management tools shall be included, such as back-up, indexing, and database cleaning tools. No third party database tools or licensing shall be required. The corporate gateway shall communicate system information between the server and controllers. The workstations shall be the main user interface to perform supervisory and programming functions.

The SMS shall enable the selection of at least two user languages. The basic dictionary shall include English, French, Spanish, Italian and German. However, the system shall include a vocabulary editor to be used in designing custom language dictionaries. The operator's profile shall permit the integration of one of the two basic languages.

The SMS shall include RS-232 / RS-485 communication link between the various system components as well as TCP/IP network interface capability. Field devices such as card readers, alarm inputs, control points, etc. shall be connected to fully distributed intelligent field panels capable of operating without host computer intervention.

The SMS shall be able to design customized ID cards directly from the access management software. No specific program or software other than the access management software and no additional licensing shall be required for this function. Any workstation shall be capable of being used as a badging station. Badging shall be fully integrated with the card database.

1.2 SUBMITTALS

A Shop Drawings

Prior to assembling or installing the SMS, the Contractor shall provide complete shop drawings which include the following:

1. Architectural floor plans indicating all system device locations.
2. Full schematic wiring information for all devices. Wiring information shall include cable type, cable length, conductor routings, quantities, and point-to-point termination schedules.
3. Complete access control system one-line block diagram.
4. Statement of the system sequence of operation.
5. Riser diagrams showing interconnections.
6. Detail drawings showing installation and mounting.
7. Fabrication drawings for console arrangements and equipment layout.

All drawings shall be fully dimensioned and prepared in DWG format using version [2008] of AutoCAD.

B Product Data

Prior to assembling or installing the SMS, the Contractor shall provide the following:

1. Complete product data and technical specification data sheets that includes manufacturer's data for all material and equipment, including terminal devices, local processors, computer equipment, access cards, and any other equipment provided as part of the SMS.

2. A system description, including analysis and calculations used in sizing equipment required by the SMS. The description shall show how the equipment shall operate as a system to meet the performance requirements of the SMS. The following information shall be supplied as a minimum:
    a. Central processor configuration and memory size
    b. Description of site equipment and its configuration
    c. Protocol description
    d. Hard disk system size and configuration
    e. Backup/archive system size and configuration
    f. Start up operations
    g. System expansion capability and method of implementation
    h. System power requirements and UPS sizing
    i. A description of the operating system and application software.

C As-Built Drawings

At the conclusion of the project, the Contractor shall provide “as built” drawings. The “as built” drawings shall be a continuation of the Contractors shop drawings as modified, augmented, and reviewed during the installation, check out and acceptance phases of the project. All drawings shall be fully dimensioned and prepared in DWG format using version [ ] of AutoCAD.

D Manuals

At the conclusion of the project, the Contractor shall provide copies of the manuals as described herein. Each manual’s contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each security system integrator installing equipment and systems and the nearest service representatives for each item of equipment for each system. The manuals shall have a table of contents and labeled sections. The manuals shall include all modifications made during installation, checkout, and acceptance. The manuals shall contain the following:

1. Functional Design Manual

   The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.

2. Hardware Manual

   The hardware manual shall describe all equipment furnished including:
   a. General description and specifications
   b. Installation and check out procedures
   c. Equipment layout and electrical schematics to the component level
   d. System layout drawings and schematics
   e. Alignment and calibration procedures
   f. Manufacturers repair parts list indicating sources of supply

3. Software Manual

   The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
   a. Definition of terms and functions
   b. Use of system and applications software
   c. Initialization, start up, and shut down
   d. Alarm reports
   e. Reports generation

f. Data base format and data entry requirements
g. Directory of all disk files

4. Operators Manual

The operator's manual shall fully explain all procedures and instructions for the operation of the system including:

a. Computers and peripherals
b. System start up and shut down procedures
c. Use of system, command, and applications software
d. Recovery and restart procedures
e. Graphic alarm presentation
f. Use of report generator and generation of reports
g. Data entry
h. Operator commands
i. Alarm messages and reprinting formats
j. System access requirements

5. Maintenance Manual

The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.

1.3 QUALITY ASSURANCE

A Manufacturer Qualifications

The manufacturers of all hardware and software components employed in the SMS shall be established vendors to the access control/security monitoring industry for no less than five (5) years and shall have successfully implemented at least 5 systems of similar size and complexity.

B Contractor / Integrator Qualifications

1. The security system integrator shall have been regularly engaged in the installation and maintenance of integrated access control systems and have a proven track record with similar systems of the same size, scope, and complexity.
2. The security system integrator shall supply information attesting to the fact that their firm is an authorized Kantech Corporate Dealer.
3. The security system integrator shall supply information attesting to the fact that their installation and service technicians are competent factory trained and certified personnel capable of maintaining the system and providing reasonable service time.

4. The security system integrator shall provide a minimum of three (3) references whose systems are of similar complexity and have been installed and maintained by the security system integrator in the last five (5) years.
5. There shall be a local representative and factory authorized local service organization that shall carry a complete stock of parts and provide maintenance for these systems.

C Testing Agencies

1. The SMS shall be tested and listed by Underwriters Laboratories (UL) for UL 294 for Access Control System Units.
2. The SMS hardware shall comply with the following regulatory requirements:
    a. FCC Part 15 Class A
    b. FCC Part 15 Class B
    c. FCC Part 68 (TIA968)
    d. ICES-003
    e. CE
    f. ECCN for AES 128 bit encryption for IP communication
    g. Government standards NISPOM 5-313 Automated Access Control Systems, DICD Annex F 2.3 Accept/Reject Threshold Criteria, JAFAN Annex D 2.3 Accept/Reject Threshold Criteria
3. The SMS shall support Americans with Disabilities Act (ADA) compliance in door and access operation.

1.4 WARRANTY

The Security Management System (SMS) shall be provided with a 12 month product warranty from date of registration. Software version updates shall be available for no charge during this warranty. The software media warranty shall be 90 days.

PART II PRODUCTS

2.1 MANUFACTURERS

The Security Management System (SMS) shall be the Kantech EntraPass Corporate Edition no substitutions.

2.2 DESCRIPTION

The Security Management System (SMS) shall be an integrated system that utilizes a Paradox database for the storage and manipulation of related data. The SMS shall include a server with applications software, corporate gateways for communication between the server and controllers, operator and administrator workstations with appropriate software, hard copy printers and fixed magnetic storage media. The security filed devices (readers, door position switches, REX, etc) shall communicate with the field panels via a dedicated cable network. The field panels shall communicate to

the server via a Fast Ethernet 10/100, TCP/IP network, RS 232/RS 485 connection, or dial up modem.

The SMS shall allow for growth and scalability from a small or entry level system to a multi site system. The SMS shall be modular in nature, allowing system capacities to be easily expanded without requiring major changes to system operation. All defined system data as well as historical information shall be maintained. Customizable user interfaces shall allow management of system information and activity for administrators and operators. The response time between the moment when a card is presented at the reader and when the door is unlocked shall not exceed one second. The SMS shall include a badging solution with a GUI for badge design. No extra license shall be required for the badging solution.

The SMS shall support up to:

20	Workstations
3	Concurrent WebStations
1	Redundant server
128	Digital video recorders
41	Corporate gateways
17,408	Controllers per gateway
17,408	Elevator controllers per gateway
34,816	Card readers and/or keypads per gateway (69632 with KT-400)
Unlimited	Access cards
Unlimited	Card families or site codes
4,456,448	Alarm points monitored per gateway
4,456,448	Control relays per gateway
2	Simultaneous user languages
1	Report printer per workstation
1	Badging printer per workstation
512	Dial up sites or IP Link
32	Serial, USB or Standard TCP/IP ports per gateway
34,816	Elevator cabs per gateway
64	Floors per elevator cab

2.3 PERFORMANCE - MONITORING

A Monitoring Mode

1. The SMS shall enable every operator to customize his/her desktop configuration. It shall be possible to modify the desktop appearance and to create up to eight desktops and to associate up to ten different display screens to each. It shall be possible to modify the size and position of all screens. It shall be possible to determine if these screens shall be floating

anywhere on the desktop or fixed on the desktop. If the workstation is equipped with a dual output video card and two or more monitors, it shall be possible to distribute the screen to multiple monitors. However, each screen shall be able to be viewed alone or together depending on operator needs. Once these parameters are saved, the configuration shall automatically take effect whenever the operator logs in.

For all types of screens, it shall be possible to access the general properties of the screen by simply right clicking at the center of the screen. From there it shall allow for linkage between associated screens without having to exit the current screen or section. It shall be possible to right click events on the desktop for editing which shall bring the user directly to the card, door, or component window and back.

2. Message Screen

   All events that occur shall appear in real time. The text shall include at least the date, time, and a pertinent description of the event as well as its condition. The display of this screen shall be customizable and a different background and message color can be used for every type of event.

   Every in-coming event shall be documented by one or more icons representing video images, photos, access card, server, gateway, controller, card reader, and relay or supervision point. It shall be possible to classify the events on the screen by sequence, date and time, type of event, or type of message. In addition, a text filter shall be available to facilitate searching. It shall be possible to access the last up to 100,000 transactions from this window without the need to request a special report.

3. Card Holder Photo Screen

   When a card is presented to a card reader, the software shall automatically display the photograph of the cardholder in this window. From this screen it shall be possible to select the cardholder's name, card number, event text, and comments as well as specify a door or group of doors for which the operator would like to display a photo. The SMS shall support the display of up to 4 pictures simultaneously.

4. Filtered Message Screen

   This screen shall be a copy of the text messages screen except it shall be possible to select a specific message filter. The SMS shall include a choice of pre-configured filters and the ability to create customized filters. For every new filter it shall be possible to associate a name to it, select the type of

event, select door, select workstation, select gateway, select supervision input, and select output.

5. Alarm Screen

   Alarms that require an acknowledgement by an operator shall be displayed on this screen in text form only. The text shall include at least the date, time and description of the alarm, and its condition. It shall be possible to classify events on the screen by sequence, date and time, type of event, or type of message. A text filter shall be available in order to facilitate the search.

   If instructions about an alarm are envisaged, they shall automatically appear in a second window on the screen. If a graphic is associated with the alarm, it shall appear automatically on the screen defined to this effect. The icon associated to the control point shall be represented and show the actual state of the point.

   The operator shall be able to access a log book in order to document the alarm that occurred. Once this information is recorded in the log it shall not be erasable or modifiable.

   It shall be possible to associate video call-up with an alarm. When this occurs, the main screen shall become the video screen, not the alarm screen.

6. Video Screen (Video View)

   When the SMS is integrated with American Dynamics digital video recorders, it shall be possible to view the video images of cameras associated with them. The SMS shall enable the creation of an unlimited number of video views, each one associated with up to 16 different cameras or graphics. It shall be possible for an operator to edit or modify an existing view or create a new one directly from this screen. For each video view it shall be possible to select sequential, mosaic pattern, or preset viewing modes.

   It shall be possible for an operator to access all the commands of a motion PTZ camera to include rotate on its axis, adjust its focus, and have a larger view of the image. Accessibility to camera images and commands shall be limited by operator security level.

   No additional licensing shall be required to perform this function.

B Graphics Screen

1. There are three options for graphics that appear as background on the screen. The first is a reproduction of the building(s) floor by floor. The graphic module shall be capable of importing files in BMP, EMF, WMF, JPEG, GIF, PCX, PNG, TIF, or PCD formats.

2. The second option is using web pages, or Webviews, as background on the screen. This can be used in the following manners:
    a. Accessing to DVR web servers
    b. Embedding default web pages into operator desktops
    c. Adding an IP camera onto a video view
    d. Embedding intranet pages or directories into the operator environment
    e. Adding Pdf, Word documents, etc. to the desktop
    f. Accessing to network cameras from the Webstation
    g. HTML or Pdf pop-up instruction on alarm
    h. Integrating report folders in the desktop for quick access

3. The third option is to assign a live video view as background on the screen if video integration is being utilized.

4. For all three options, control points shall be represented by a descriptive icon. Control points include workstations, gateways, controllers, card readers, doors equipped with either card readers or supervision contacts, cameras, relays, and input monitoring points such as motion sensors. The icons shall be animated, meaning they shall represent the state of the point to which they are associated in real time. Every graphic shall support at least 100 control points.

    Right clicking on an icon shall directly access the manual commands of each control point. A door shall be capable of but not limited to temporarily unlocking, manually unlocking or locking, and enabling or disabling a reader. A supervision point shall be capable of being enabled or disabled. A control relay shall be capable of being activated, deactivated, or temporarily activated. Cameras shall be capable of viewing images or live video.

    No additional licensing shall be required to perform this function.

C Communication Methods

1. The SMS shall ensure the communication to remote sites over a LAN or WAN/Internet using a dedicated communication server device, IP Link or the KT-400 controller. It shall ensure secure communications by the use of 128-bit AES Encryption. It shall reduce bandwidth consumption by managing the communication protocol of Kantech controllers at the remote site. Polling of Kantech controllers shall be done by the IP Link or KT-400 in the field and not over the network. The IP Link or KT-400 shall provide support for up to 32 door controllers. The IP Link or KT-400 shall be configured from the

access software or from a web page which has the security feature of being disabled after successful use.

2. For sites that do not have network links, communication to remote sites shall be ensured by Dial-up modems. The SMS shall support up to 32 such modems that can simultaneously communicate and transmit or receive data from remote sites. No modem shall be dedicated to specific sites; communication shall be established such that the first site calling shall have access to the first available modem, and so on.

3. The SMS shall be capable of managing up to 32 local controllers per loop with the use of RS- 232 or RS-485 protocols. In addition, it shall be able to use SERIAL, USB, or NETWORK ports to communicate with controllers.

4. In all communication methods, the door controller shall retain in their memory all necessary data for controlling doors that they supervise. In case of communication failure, the door controller shall execute all its functions normally.

2.4 PERFORMANCE – PROGRAMMING & CONFIGURATION

A User Section

1. This section shall include all functions involved in the issuance of an access or ID card as well as database search and importation tools. During the addition or modification of a card, information about the card shall be sent to the door controllers affected by these new parameters as soon as the operator accepts the addition or modification. An additional command requiring a reloading of the cards database in the door controllers shall not be acceptable.
2. The SMS shall enable the creation and definition of a user access card. There can be up to five cards per user and users can be managed by cardholder name or card number. When creating user cards, the operator shall be able to select a card format directly from a Card dialog and enter the card number as it is printed on the card.
3. The following user information shall be able to be saved in the user section:
    a. Card number
    b. First and last name
    c. Card type
    d. Additional information (10 fields)
    e. Start date
    f. Expiry date
    g. Personal ID number (PIN)
    h. State of the card
    i. Comments

In addition, it shall be possible to associate a photograph, signature, and badge template to a card.

4. The SMS shall allow for the creation of an unlimited number of card templates to be used as ID cards. Template parameters include name, number of sides, and size. It shall be possible to directly print a template on an access card. The operator shall be able to design customized badging templates directly from the access management software. No specific badging program or software other than the latter and no additional licensing shall be required for this function. Any workstation shall be capable of creating ID cards based on operator security level. The following items shall be capable of being added to and modified on a badge template:
    a. All information fields associated to a cardholder
    b. Bar code
    c. Text zone
    d. Start date, expiry date, today's date
    e. Saved images and logos
    f. Borders
    g. Rectangles (including rounded rectangles, ellipse)
    h. Lines and arrows
    i. Photograph (can be cropped)
    j. A background

5. The SMS shall allow for the creation of a day pass to be issued to visitors for a single day. The SMS shall also have the ability to create temporary ID visitor cards.

6. The SMS shall offer the possibility of modifying the parameters of a group of cards simultaneously based on Card Type. The system shall enable the creation of an unlimited number of card types. The following fields shall be modifiable:
    a. Card status (valid, invalid, lost, stolen)
    b. Card monitored (yes, no)
    c. Start date (schedule)
    d. End date (schedule)
    e. Delete after expiration (yes, no)
    f. Wait on keypad (yes, no)
    g. Access group (selection menu)
    h. Template model (selection menu)

7. The operator shall be able to search for a card by last or first name, card creation date, card number, or any of the ten fields of user definable information. The system shall display the last card transactions, namely the latest sixteen denied access events, authorized events, database events, and/or time & attendance events.

8. The SMS shall enable the creation of an unlimited number of Import/Export models, give them a name, select required fields, select their layout, and determine the filed delimiter. This shall allow for acceleration of the data entry process by importing databases from a spreadsheet.

9. The SMS shall allow for 250 access levels programmed per site. Every card shall be assigned an access level which shall determine where and when the access card will be valid. When the system consists of several sites or gateways, it shall be possible to use batch programming of access levels.

B Video Section

1. The SMS shall be capable of being combined with up to 128 American Dynamics Intellex digital video recorders. From any of the workstations it shall be possible to do the following:
    a. View one or more camera images from different sources
    b. Query the history of each recorder and view images saved on disk
    c. View, modify, or delete programming parameters of a recorder
    d. Control the movement of all motion cameras directly with the workstation mouse of the SMS (PTZ control)
    e. Export camera images to hard disk and video vault (capable of exporting multiple formats, password protected to protect chain of evidence)

2. The SMS shall ensure the time management and synchronization for all digital video recorders. It shall be possible to determine the time refresh frequency on the network. The SMS shall allow for configuration of each digital video recorder. For each recorder it shall be possible to:
    a. Assign a name
    b. Determine the recorder type
    c. Determine the network IP address
    d. Manually configure the video, communication and event ports
    e. Determine the number of cameras
    f. Determine the query frequency
    g. Determine the number of failed queries required before a loss of communication message is displayed on the screen
    h. Import camera details from existing video servers

3. The SMS shall define the programming parameters for every camera connected to a digital video recorder. For each camera it shall be possible to:
    a. Assign a name
    b. Determine the type of camera

c. Assign a representative icon for identification on a graphic screen
d. Determine if the camera image can be visible on a video view
e. Determine the type of recording
f. Determine which events from the recorder should display an alarm message on the screen
g. Determine the number of pre-selections desired
h. Determine the number of patterns desired
i. Add comments to record in the video vault

4. The SMS shall allow for the creation of an unlimited number of video views. For each video view it shall be possible to connect up to 16 cameras from various sources. The video view programming parameters make it possible to:
    a. Assign a name
    b. Determine the view size
    c. Determine the refresh rate of the image
    d. Determine whether to show metrics
    e. Determine whether to show camera controls
    f. Determine whether to show overlays
    g. Determine whether to auto-hide text
    h. Determine whether to activate image zoom
    i. Determine whether to activate video sequence
    j. Determine delay before sequence launch
    k. Determine camera display delay
    l. Determine display pre-selection delay
    m. Determine pattern display delay
    n. Determine graphic display delay
    o. Determine display mode
    p. Incorporate up to 16 cameras from various sources or 16 graphics

5. The SMS shall be able to trigger, from one or more specific events, the start of recording on a recorder with one or more cameras connected to it. The SMS shall allow for the creation of an unlimited number of video triggers. The SMS shall allow for the creation of an unlimited number of recording parameters. For each recording parameter it shall be possible to:
    a. Define a name
    b. Select the digital video recorder to which this recording parameter refers
    c. Select the camera to which this recording parameter refers
    d. Associate a pre-selection or size
    e. Determine the start recording trigger
    f. Determine the pre-alarm time
    g. Determine the total recording time
    h. Determine the stop recording trigger

6. It shall be possible for a video event on one digital video recorder to trigger an action on another digital video recorder.

7. The SMS shall allow the playback of all recordings stored on the hard drive of any of the digital video recorders. The operator shall be able to save the video into the video vault.

8. The SMS shall provide the operator access to the complete list of normal and abnormal events that required the activation of video recording. The sequence of images can be saved to a hard drive for subsequent consultation and shall be encrypted. The SMS shall allow the operator to access a complete list of alarm recordings in progress including origin of the alarm. The SMS shall be capable of displaying a list of exported videos.

9. It shall be possible to view recorded video tagged to an Access or Video event by quick linking from the Message desktop.

C Definition Section

1. The SMS shall allow the creation of 100 schedules per site and each schedule can include up to 4 intervals. A schedule can be associated with a supervision point, a relay, an access level, a door, an operator, or an event. The SMS shall allow time zone management.

2. The SMS shall allow the creation of 366 holidays. It shall be possible to define a name, define a date, and determine the type.

3. The SMS graphics shall enable operators to view the exact location of a component installed at the site, or the state of components and peripherals represented in the graphic such as doors, contacts, motion sensors, controllers, and cameras. The SMS shall allow for the creation of an unlimited number of graphics. The components on the graphics represented by icons as well as the graphics themselves shall have the ability to be modified.

4. The SMS shall allow the management of 34,816 elevator cabs of 64 floors each. It shall be possible to associate a schedule to the call button. Outside of the schedule, a valid card for a particular floor will have to be presented to the cab reader for it to be activated. The floor selection button group associated with the card's access level will become operational for a predefined duration and all other buttons shall become inactive. The SMS shall allow the creation of groups of floors and access levels.

D Devices Section

1. The physical components of the SMS including workstations, corporate gateways, controllers, doors, relays, and monitored inputs shall be individually configured and defined. Individual sites shall also be defined. The software shall allow the use of a controller Express Setup feature in order to minimize the time needed for controller definition.

E Alarm Interface

1. The SMS shall allow interface with any external alarm system thereby arming or disarming the system by presenting a valid card to an entry / exit door. It also shall be possible to associate a keypad with a reader forcing the cardholder to enter a number in the keypad after presenting a card. It shall be possible at a minimum to:

    a. Set a monitored input as an arming button
    b. Associate a usage schedule with an arming button
    c. Set the exit and entry delay
    d. Determine whether the system must wait for a valid access to arm
    e. Determine whether the door must relock on arming request
    f. Associate a monitored input with an alarm panel condition
    g. Lock a door unlocked by a schedule when armed

F System Section

1. The SMS shall define the profile of a system operator based on name, password, language, privileges, login schedule, security level, workspaces, and password expiry date.

2. The SMS shall determine access rights granted to an operator based on security levels. There shall be three predefined access levels called Installer, Administrator, and Guard and the SMS shall have the ability to create an unlimited number of security levels that can be assigned to one or more operators. It shall be possible to determine from which system components the operator shall be authorized to receive events and take action.

3. The SMS shall allow System Administrators to grant or deny operators access to system physical components such as gateways, sites, relays, etc. using Workspaces. This allows greater ease for larger sites to locate and assign components that pertain to specific gateways and sites. System administrators shall be able to tailor specific system applications and workstations Workspaces, therefore restricting access to information to all levels of operators. Operators shall be able to use temporary workspaces to narrow their fields of view when accomplishing tasks, then easily revert back to their main workspace.

4. The SMS shall allow for the creation of unlimited instructions. These instructions shall be attributed to one or more events that will be used in documenting the event and guide the operator on duty in performing tasks. It shall be possible to edit the instructions in two different languages.

5. The SMS shall make it possible to customize system events. All events shall be pre-defined to display on all system workstations. For each event it shall be possible to:
    a. Determine a display schedule

b. Determine a color
c. Assign a printer
d. Associate one or more workstations
e. Associate an instruction
f. Associate a schedule for an acknowledgement request
g. Determine the priority level

G Report Section

1. The SMS shall include templates for various types of reports to include the following:
    a. Card use reports
    b. Manual operations reports
    c. Alarm reports
    d. Historical reports
    e. Time & Attendance reports
    f. Detailed reports
    g. Summary reports
    h. Statistical reports

2. The SMS shall allow for the creation of custom reports based on any event or component in the system. The SMS shall support an unlimited amount of customized reports.

3. All reports shall be able to be displayed on screen, printed, or sent by e-mail on a daily, weekly, or monthly basis. All event reports can be automated to be generated and sent at a specific time for a specific time frame.

4. The SMS shall support at a minimum the following report formats: Paradox, Dbase IV, CSV, XLS, PDF, RTF, and TXT.

H Options Section

1. The SMS shall allow operators to access basic server and display functions and allow the operator to determine default settings for the server hard drive. The operator shall also be able to determine the time to perform a server backup, programmable on monthly, weekly, or daily basis.

I System Status Section

1. The SMS shall allow operators to view the state of various access system components in text or numerical form. A specific controller's state shall also be able to be viewed in graphic form via the picture of the controller with the status of each terminal. Workstation and database status shall also be able to be displayed.

J Various Tools

1. The SMS shall employ an Express Setup to configure system components such as sites and controllers, as well as peripherals associated to these components such as ports and inputs. This utility will reduce the programming time to a minimum.

2. The SMS shall employ a database utility to allow the re-indexation and verification of archived files and verify the integrity of indexes, links, and database arborescence.

3. The KT-Finder tool shall help troubleshoot the IP Link and KT-400 on site or remotely. It can also be used as an alternate method of configuration.

4. The SMS shall include a vocabulary editor to be used in designing custom language dictionaries.

K Video Vault

1. Video Vault is an optional remote networked application used to automate recovery of video data from the digital video recorders and save it on a disk for long term video storage and retrieval. The information can be stored on an independent system or within the server. The footage that shall be tagged and recoverable from the digital video recorders shall include SMS triggers, manual triggers, and saved video server footage.

2. For the archived video files it shall be possible to:

    a. Assign a folder name to index the archived files
    b. Create sub folders based on day of the week, day, week, month of the year, month, video server name, camera name and/or event description name.
    c. Determine the hard drive to store the recovered videos
    d. Determine the composition of the name of the saved file
    e. Determine the format of the saved video
    f. Assign a frame from the saved video to represent as a saved file
    g. Determine the number of simultaneous downloads
    h. Determine a size limit for recoverable videos
    i. Assign a password to videos stored
    j. Determine a delay between requests to the server

3. There shall be scheduled transfers for archiving thereby reducing video network traffic during peak times.

2.5 PERFORMANCE – WEBSTATION

A Webstation

1. Webstation is an optional tool that will allow for performing certain functions from a remote location to be used with the regular SMS system via Web Browser. The Webstation provides card management to guards, secretaries, or managers without the need to deploy a full workstation. A concurrent connection option shall provide access to a pre-determined number of users.

2. The following functions are available using Webstation:
    a. Card management
    b. Forgot Password & Reset password
    c. Assigning access levels
    d. Performing door operation
    e. Performing relay operation
    f. Performing input operation
    g. Historical reports
    h. Using Webviews

2.6 INTEGRATION

A Smartlink

1. The Smartlink application offers the ability to send messages to pagers and cell phones and through the use of e-mail. Smartlink provided instant e-mail notification of alarm events and the ability to e-mail reports.

2. Integration with other systems can also be done through the Smartlink API. This tool is used for advanced integration with third party applications like visitor management software, human resources systems, time and attendance systems, video systems, HVAC, etc.

B Card Gateway

1. The Card Gateway is an optional external interface that shall allow the client to make modifications to the system card database through an Oracle or MS-SQL database. The application may be installed and run on the server's CPU. It shall allow for HR software integration and enable operators to modify, add, or obtain information on cards in real time.

2.8 OPERATION

The SMS shall perform the following tasks:

1. Allow card access management for one or more buildings.

2. Control access to various doors equipped with a card reader. Allow the ability to set card use count options to limit the number of times a card can be used.

3. Ensure more secure control with the anti-passback control function.

4. A command from a door controller may demand an immediate reaction from another door controller located at another site. This functionality is supported by applications such as SmartLoop.

5. Monitor all defined alarm points as well as all doors controlled by card readers based on programmed schedules.

6. Send transactions for which printing is required to one or more printers, based on a set schedule.

7. Access the system using the main and secondary menus (to which access is limited by a password) to make additions and required changes to various data files so that they can be updated by the user without the manufacturer's assistance.

8. Enable the entry of access code data for every card or group of cards.

9. Associate to each event a recording schedule for each destination (hard drive, monitor).

10. Automatically display all alarms on screen in text with optional graphic or picture and trigger a sound requiring an acknowledgement on the keyboard to stop the alarm.

11. Each event should print on a log printer. For security reasons, each event shall be incremented with a print number. Numbering shall start from 0 every day.

12. Generate reports and view them on the screen, output them to a printer, or send them to an email address.

13. Supervise based on programmed schedules of specific points such as door contacts, volumetric detectors, mechanical points, high and low temperature sensors, or any other equipment necessary for good building management.

14. View and/or save video images.

15. When integrated into a digital video recording system (American Dynamics), allow the management of the recordings of all the cameras via access system workstations.

16. When connected to a digital video recording system (American Dynamics), allow the orientation of all PTZ cameras directly using the workstation mouse of the access system.

17. When connected to a digital video recording system (American Dynamics), allow the recovery and storage of selected videos to an independent server.

18. When the access control system manages parking lot entry and exit, it shall be possible to set a maximum number of vehicles authorized to simultaneously access the parking area. Once the parking lot is full, the system shall prevent access to any cardholder for as long as a parking space has not become available.

19. Allow the definition of a controller-based interlock function, that is, a cab or room delimited by two electronically controlled doors will not open simultaneously, creating a buffer between a low-security and a high-security area. The door leading to the high-security area will not open if the first door was locked until the person who is trying to access the high-security area meets all identity verification parameters.

20. Save events on a hard drive according to required criteria.

21. Perform the following operations from all workstations:
    a. Lock or unlock one door or a group of doors;
    b. Activate or deactivate a relay or a group of relays;
    c. Activate or deactivate the recording of one camera or a group of cameras;
    d. Activate or deactivate a point or a group of points;
    e. Program or modify one card or a group of cards;
    f. Validate or invalidate one card or a group of cards;
    g. Change time and date;
    h. Demand the system state in text or graphic mode;
    i. Query, create and/or modify data on: Access levels, Schedules and holidays, Access card, Instructions, Reports and log, Doors, Supervision points and relays, Operator levels, and Graphics

2.9 EQUIPMENT

A Server Requirements

The SMS server server shall meet the following minimum requirements:

1. The server shall have an Pentium IV processor, 1.8 GHz or better
2. The server shall have a 500-watt power unit
3. The server shall have 1 GB RAM.
4. The server shall have 20 GB hard disk drive space
5. The server shall have a 48xCD / DVD ROM drive
6. The server operating system shall be Windows 2000/XP/2003 Standard and Enterprise Server Edition/ Vista Enterprise, Business and Ultimate. All OS's must be 32 bit.
7. The server shall have a 10/100/1000 Base-T network adapter
8. The server shall have a high quality multilingual keyboard
9. The server shall have a two button ergonomic mouse
10. The server shall have an On-Off switch
11. The server shall have an appropriate UPS

12. Provide rack to house server

B Workstation Requirements

The SMS workstations shall meet the following minimum requirements:

1. The workstation shall have an Pentium IV processor, 1.8 GHz or better
2. The workstation shall have a 500-watt power unit
3. The workstation shall have 1 GB RAM.
4. The workstation shall have 20 GB hard disk drive space
5. The workstation shall have a 48xCD / DVD ROM drive
6. The workstation operating system shall be Windows 2000/XP/2003 Standard and Enterprise Server Edition/ Vista Enterprise, Business and Ultimate. All OS's must be 32 bit.
7. The workstation shall have a 10/100/1000 Base-T network adapter
8. The workstation shall have a high quality multilingual keyboard
9. The workstation shall have a two button ergonomic mouse
10. The workstation shall have 32 MB graphic adapter card
11. The workstation shall have a 24-bit (16 million colors) color depth monitor with a screen resolution of 1024 x 768
12. The workstation shall have an On-Off switch
13. The workstation shall have an appropriate UPS

C Controllers

The SMS shall support the following door controllers:

1. Kantech KT-400

   The KT-400 is an Ethernet-ready four door controller with sixteen monitored points, on-board door strike power, sixteen reader outputs, four relay outputs, and auxiliary power output. It shall accept Wiegand, proximity, ABA clock and data, bar code, magnetic, integrated keypad, and smart card reader types. It supports RS-232, RS-485 and 128-bit AES Encrypted Ethernet 10/100Base-T communication. It supports expansion modules to provide 256 inputs and 256 outputs.

D Card and Reader Support

1. The SMS shall support configuration of unlimited card formats.
2. The SMS shall support up to 2 card formats per controller (3 with DUAL ioProx driver).
3. The SMS shall support readers that provide Wiegand signaling and magnetic ABA signaling to include:
   a. Kantech ioProx family of readers
   b. Provide P325XSF readers
   c. Provide 100 P20DYE Access Control Cards

E Request to Exit Detector

1. Provide Kantech T.Rex Passive infrared request to exit detector.

PART 3 EXECUTION

3.1 TESTING

1. The software shall be entered into the SMS computer systems and debugged. The Contractor shall be responsible for documenting and entering the initial database into the system. The Contractor shall provide the necessary blank forms with instructions to fill-in all the required data information that will make up the database. The database shall then be reviewed by the Contractor and entered into the system. Prior to full operation, a complete demonstration of the computer real-time functions shall be performed. A printed validation log shall be provided as proof of operation for each software application package. In addition, a point utilization report shall be furnished listing each point, the associated programs utilizing that point as an input or output and the programs which that point initiates.

2. Upon satisfactory on-line operation of the system software, the entire installation including all subsystems shall be inspected. The Contractor shall perform all tests, furnish all test equipment and consumable supplies necessary and perform any work as required to establish performance levels for the system in accordance with the specifications. Each device shall be tested as a working component of the completed system. All system controls shall be inspected for proper operation and response.

3. Tests shall demonstrate the response time and display format of each different type of input sensor and output control device. Response time shall be measured with the system functioning at full capacity. Computer operation shall be tested with the complete data file.

4. The Contractor shall maintain a complete log of all inspections and tests. Upon final completion of system tests, a copy of the log records shall be submitted as part of the as-built documentation.

3.2 TRAINING

The Contractor shall provide a competent trainer who has extensive experience on the installed systems and in delivering training to provide the instruction. As an alternate, the Contractor may propose the use of factory training personnel and coordinate the number of personnel to be trained.

MAINTENANCE

1. The Contractor shall offer a Kantech Advantage Program (KAP) to provide twelve additional months of free software updates and online training for the end user.

2. Technical support is available at no charge to all Kantech dealers whether or not they have a KAP activated for the systems they are supporting.

PART 4 EXECUTION

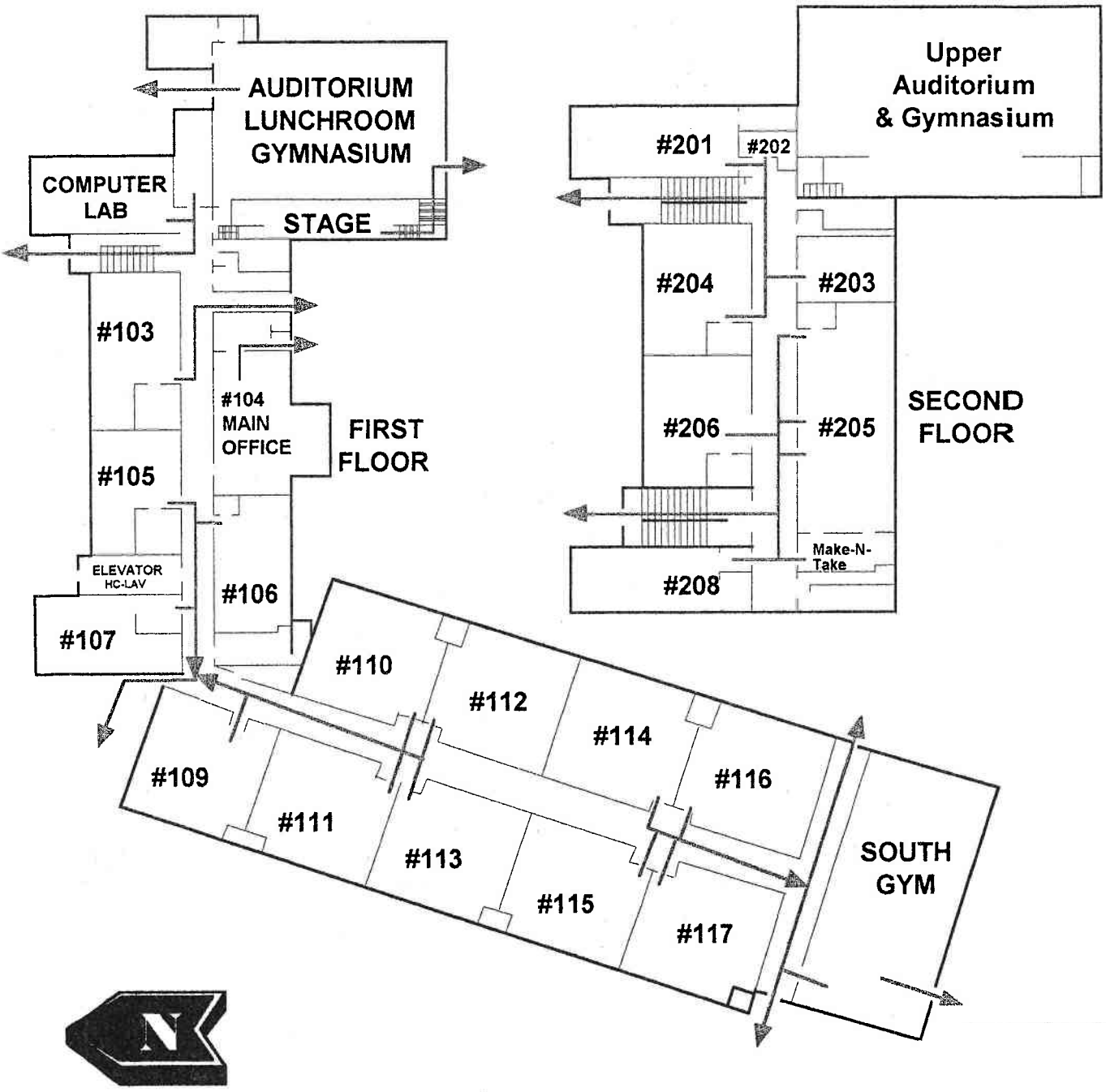
4.1 SCHEDULE

Opening #	Hardware Group	Card Reader	Request to Exit Switch	Door position Switch	Electrified Hardware Power
100A	11	1	by 8710	by 8710	by 8710
100G	11	1	by 8710	by 8710	by 8710
100H	1C	1	by 8710	by 8710	by 8710
106B	1C	1	by 8710	by 8710	by 8710
109A	1C	1	by 8710	by 8710	by 8710
109B	6D	1	by 8710	2	by 8710
113A	1C	1	by 8710	by 8710	by 8710
118A	9	1	by 8710	by 8710	by 8710
118C	9	1	by 8710	by 8710	by 8710
119	6B	1	1	by 8710	by 8710
300A	6C	1	by 8710	by 8710	by 8710
300C	1C	1	by 8710	by 8710	by 8710
305	5B	1	1	by 8710	1
306	5	1	1	by 8710	1
308	4A	1	1	by 8710	1
309	4A	1	1	by 8710	1
320B	1C	1	by 8710	by 8710	by 8710
325A	12A	1	by 8710	by 8710	by 8710
326A	18	1	by 8710	2	by 8710
200A	13	1	by 8710	by 8710	by 8710
200B	14	1	by 8710	by 8710	by 8710
201A	5C	1	by 8710	by 8710	by 8710
RWI-100	19	1	by 8710	2	by 8710
RWI-101	9	1	by 8710	by 8710	by 8710
Freight Elev	8A	1	n/a	n/a	n/a

END OF SECTION

Fairmont School District ISD # 2752

William Budd Elementary
1001 Albion Avenue
Fairmont, MN 56031
507-238-4234



Fairmont School District ISD # 2752

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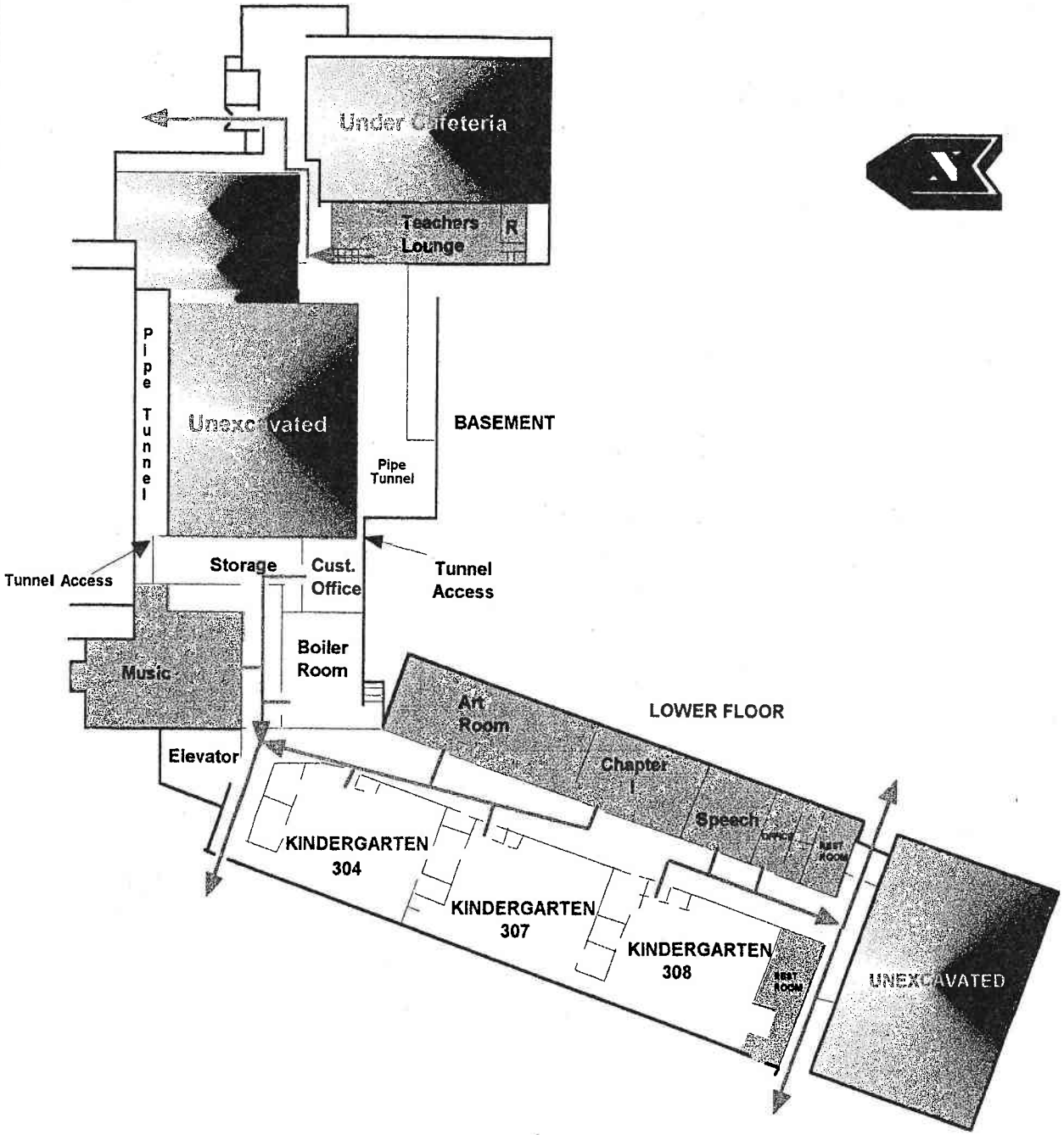


Date: May 19, 2011

Project: Fairmont Water Treatment Plant Asbestos Removal

IEA Project Number: 1001435

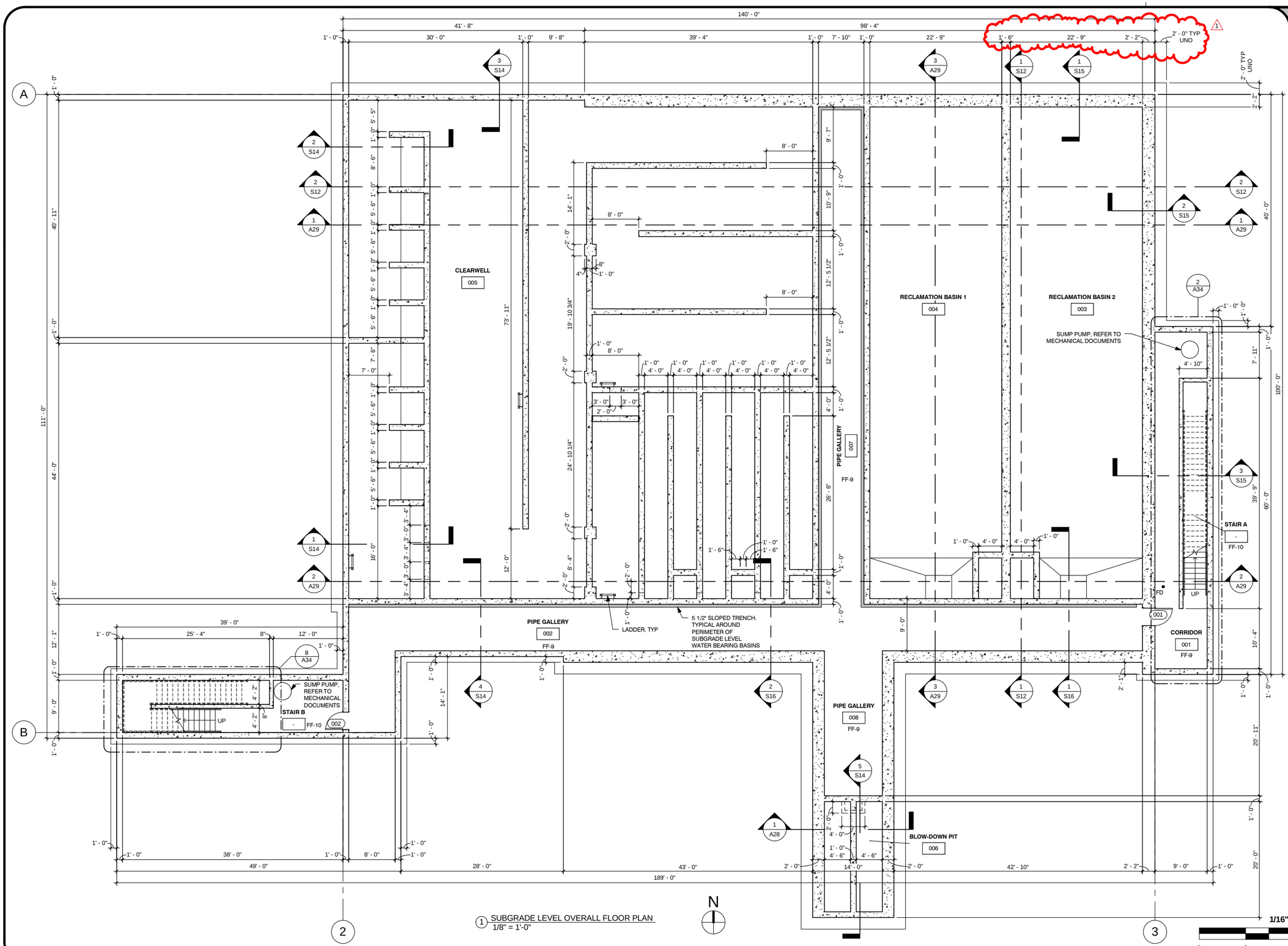
Owner: City of Fairmont

From: George Rosburg, IEA, Inc.

Laboratory analysis revealed the following:

Sample #	Location of Paint	Description of Paint	Lead Concentration	Positive or Negative
L-1	Exterior	Gray	<0.010%	Negative
L-2	Filter Pump Area Wall	Aqua	0.045%	Negative
L-3	Raw Pump Room Wall	White/Aqua	<0.010%	Negative
L-4	Clarifier Room Duct	White	<0.010%	Negative
L-5	Meter Room	Light Green	0.29%	Negative
L-6	Clarifier Room Floor	Gray	0.056%	Negative
L-7	Clarifier Room Wall	Aqua	0.014%	Negative

The Minnesota Pollution Control Agency (MPCA) requires that all loose and flaking lead-based paint (>1.0 mg/cm2) to be stabilized prior to demolition.



1 SUBGRADE LEVEL OVERALL FLOOR PLAN
1/8" = 1'-0"

1/16" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Mark E. Cipos

TYPED NAME: MARK E. CIPOS

ISSUE DATE: MAY 20, 2011

REG NO: 42607

NO.	DATE	REVISION
1	05-20-11	REVISED DIMENSIONS

APPROVED

IS GROUP
One firm - start to finish™

AE2S

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT
SUBGRADE LEVEL OVERALL FLOOR PLAN

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	CONSTRUCTION
TECHNICIAN	RLP
CHECKED / APPROVED	DCB
DATE	MAY, 2011
PROJECT NUMBER	08-11592
SHEET	46 of 101

A11

KEYPLAN

1'-10" CIP CONCRETE SLAB WITH (2) MATS OF REINFORCING.
MAJOR DIRECTION (EAST-WEST)
TOP MAT: #7 BARS @ 12" OC
BOTTOM MAT: #8 BARS @ 12" OC
MINOR DIRECTION (NORTH-SOUTH)
TOP MAT: #6 BARS @ 12" OC
BOTTOM MAT: #6 BARS @ 12" OC

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

WALL REINF TYPE 10
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

STEP IN T.O. WALL

WALL REINF TYPE 10
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

1'-10" CIP CONCRETE SLAB WITH (2) MATS OF REINFORCING.
MAJOR DIRECTION (EAST-WEST)
TOP MAT: #7 BARS @ 12" OC
BOTTOM MAT: #8 BARS @ 12" OC
MINOR DIRECTION (NORTH-SOUTH)
TOP MAT: #6 BARS @ 12" OC
BOTTOM MAT: #6 BARS @ 12" OC

2' - 0" TYP UNO

T.O. GROUT: 85'-6". SLOPE DOWN TO SOUTH. TYP IN RECLAMATION BASIN 1&2

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"
TYP. ALL WALLS IN CLEARWELL, UNO

2'-0"x2'-0" CIP CONCRETE COLUMN WITH (8) #6 BARS VERTICAL AND #4 TIES @ 6" OC, TYP. OF (4)

CLEARWELL
005

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

1'-10" CIP CONCRETE SLAB WITH (2) MATS OF #6 BARS @ 12" OCEW

2'-0" WIDE x 2'-0" HIGH OPENING. B.O. OPENING:83'-0". TYP OF (4)

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

LADDER

T.O. WALL: 93'-0"

B.O. WALL: 79'-0"

STEP IN B.O. WALL TYP

B.O. WALL: 83'-0"

LADDER

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

3'-0" WIDE x 1'-8" HIGH OPENING. B.O. OPENING:97'-0"

2'-0" WIDE x 2'-0" HIGH OPNG. B.O. OPENING:83'-0". TYP OF (4)

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

(5) 1'-0"o OPENINGS @ 2'-0" OC VERT. B.O. LOW OPENING: 86'-0".

STEP IN T.O. WALL

5 1/2" SLOPED TRENCH. TYPICAL AROUND PERIMETER OF SUBGRADE LEVEL WATER BEARING BASINS

RECLAMATION BASIN 1
004

RECLAMATION BASIN 2
003

1'-10" CIP CONCRETE SLAB WITH (2) MATS OF REINFORCING.
MAJOR DIRECTION (NORTH-SOUTH)
TOP MAT: #7 BARS @ 6" OC
BOTTOM MAT: #8 BARS @ 6" OC
MINOR DIRECTION (EAST-WEST)
TOP MAT: #6 BARS @ 12" OC
BOTTOM MAT: #6 BARS @ 12" OC

WALL REINF TYPE 2
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

WALL REINF TYPE 6
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

WALL REINF TYPE 3
B.O. WALL: 78'-6"
T.O. WALL: 98'-0"

STEP IN B.O. WALL
T.O. GROUT: 83'-0"
B.O. GROUT: 78'-6"

PIPE GALLERY
007

PIPE GALLERY
002

WALL REINF TYPE 2
B.O. WALL: 78'-6"
T.O. WALL: 98'-0"

WALL REINF TYPE 6
B.O. WALL: 78'-6"
T.O. WALL: 98'-0"

STEP IN B.O. WALL
T.O. GROUT: 83'-0"
B.O. GROUT: 78'-6"

WALL REINF TYPE 10
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

ADDITIONAL REINFORCING IN 1'-10" CIP CONCRETE SLAB.
MAJOR DIRECTION (EAST-WEST)
BOTTOM MAT: #8 BARS @ 6" OC

1'-6" CIP CONCRETE SLAB WITH (2) MATS OF #5 BARS @ 12" OCEW

SUMP PUMP, REFER TO MECHANICAL DOCUMENTS

WALL REINF TYPE 1
B.O. WALL: 83'-0"
T.O. WALL: 99'-4"

STAIR A

WALL REINF TYPE 10
B.O. WALL: 78'-6"
T.O. WALL: 98'-0"

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 109'-0"
TYP. (3) EXTERIOR WALLS OF STAIR A

CORRIDOR
001

WALL REINF TYPE 10
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

STEP IN B.O. WALL

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 99'-0"

WALL REINF TYPE 1
B.O. WALL: 83'-0"
T.O. WALL: 99'-4"

STEP IN T.O. WALL

SUMP PUMP, REFER TO MECHANICAL DOCUMENTS

STAIR B

1'-6" CIP CONCRETE SLAB WITH (2) MATS OF #5 BARS @ 12" OCEW

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 98'-8"

WALL REINF TYPE 9
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

PIPE GALLERY
008

WALL REINF TYPE 9
B.O. WALL: 83'-0"
T.O. WALL: 98'-0"

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 99'-0"
STEP IN T.O. WALL

WALL REINF TYPE 3
B.O. WALL: 92'-9"
T.O. WALL: 97'-6"

WALL REINF TYPE 3
B.O. WALL: 83'-0"
T.O. WALL: 99'-0"

BLOW-DOWN PIT
006

STEP IN T.O. WALL

STEP IN T.O. WALL

1 SUBGRADE LEVEL STRUCTURAL FLOOR PLAN
1/8" = 1'-0"

1/8" = 1'-0"

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Jason E. Hoehn
TYPED NAME: JASON E. HOEHN
ISSUE DATE: MAY 20, 2011
REG. NO. 40422

NO.	DATE	REVISION
1	05-20-11	REVISED DIMENSIONS

APPROVED

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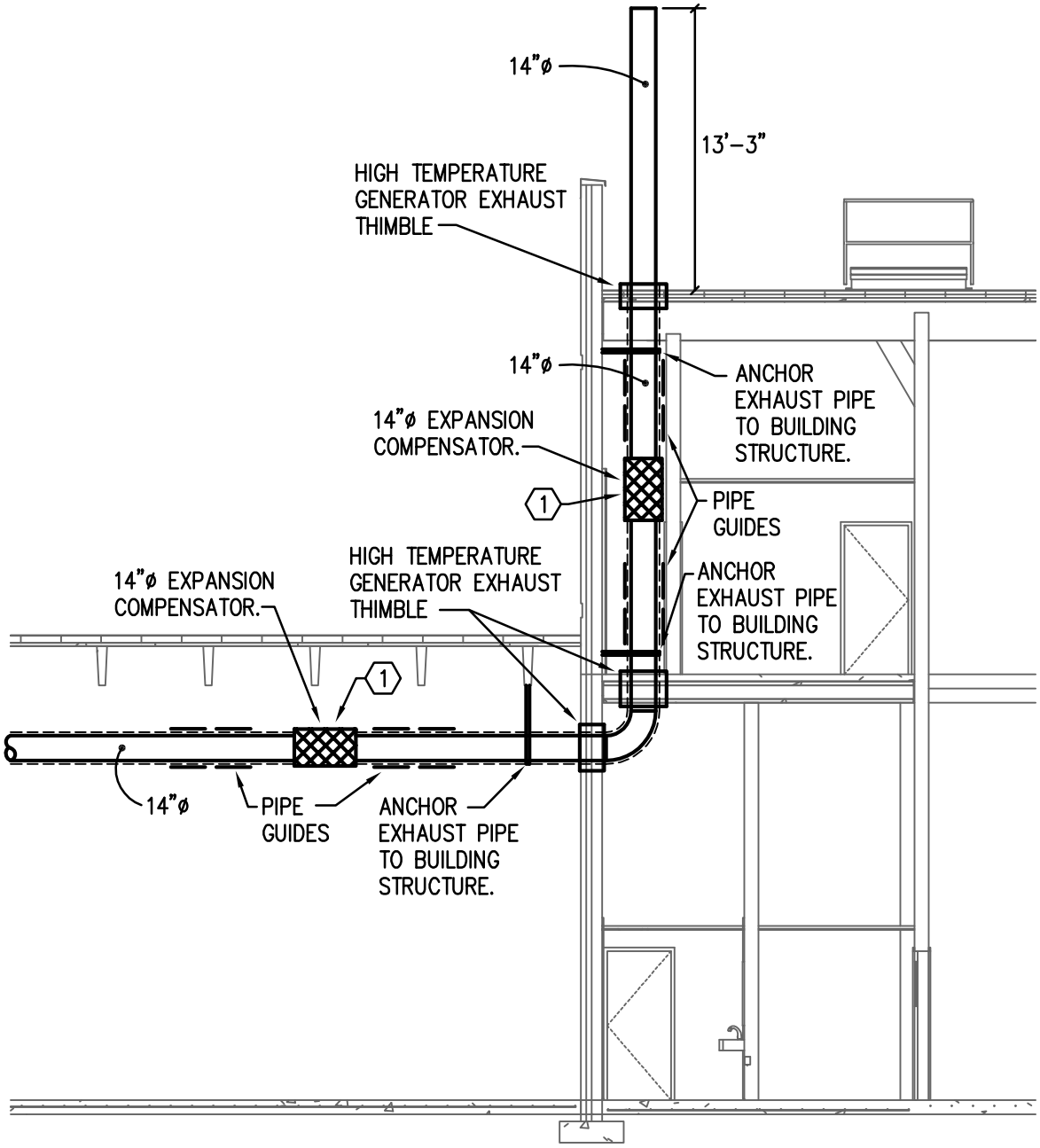
One firm - start to finish™

AE2S

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT
SUBGRADE LEVEL STRUCTURAL FLOOR PLAN

FAIRMONT PROJECT #: WTF2008-03
DRAWING TYPE: CONSTRUCTION
TECHNICIAN: RLP
CHECKED / APPROVED: JEH
DATE: MAY, 2011
PROJECT NUMBER: 08-11592
SHEET: 79 of 101

S01



NUMBERED NOTES:

1. 14"ø EXPANSION COMPENSATOR. PROVIDE TWINCITY HOSE EXHAUST EXPANSION JOINT MODEL NO. LCB-14-L.

1 / AD2-1 **EXHAUST PIPE SECTION**

NO SCALE

DATE	REVISION	APPROVED
05-20-11	ADDENDUM NO. 2	DAS

AES2

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT
FAIRMONT, MINNESOTA
ADDENDUM NO. 2 - EXHAUST PIPE SECTION

FAIRMONT PROJECT #	WTF2008-03
TECHNICIAN	DAJ
CHECKED / APPROVED	DAS/DAS
DATE	MAY, 2010
PROJECT NUMBER	P05194-2008-00

AD2-1

Autodesk Map 3D 2007
AE2S Project No.: P01008-2009-00
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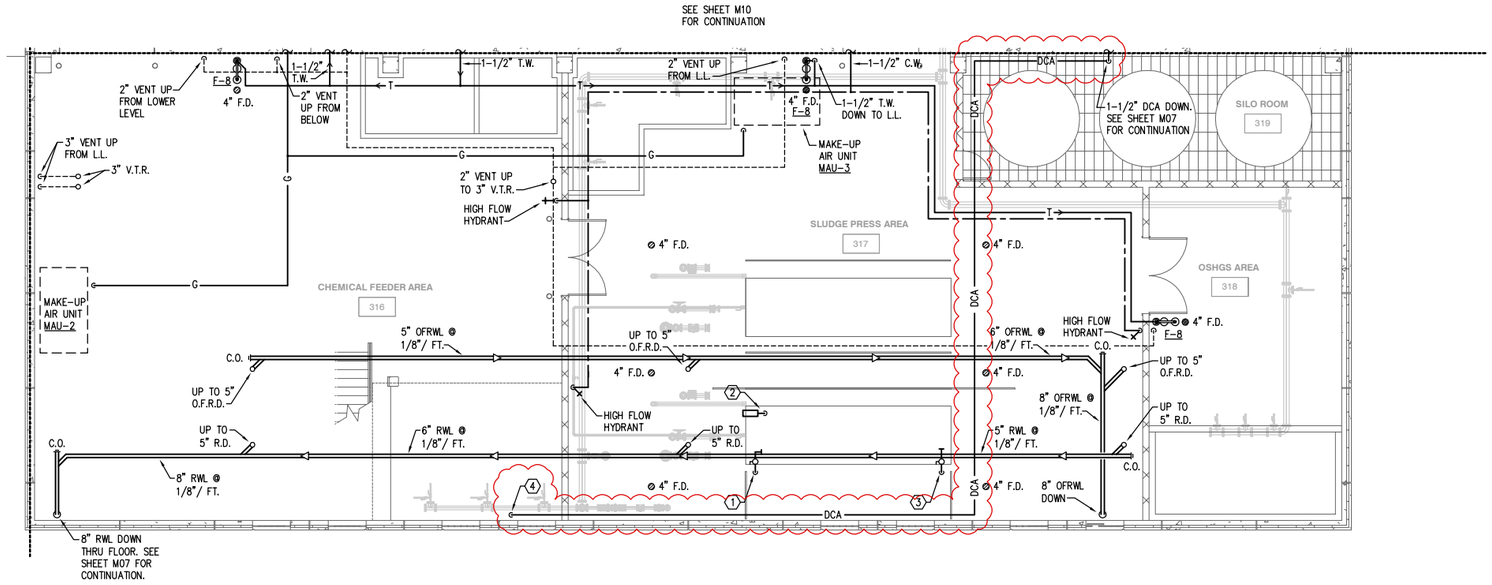

1 / M11 CHEMICAL UNLOADING GARAGE - OPERATIONS LEVEL - PLUMBING PLAN

4 2 0 4 8

NORTH

GENERAL NOTES:

1 – SUPPORT ALL PIPING AS HIGH AS POSSIBLE

2 – HOSE BIBB TO BE MOUNTED AT 36" A.F.F. AND WALL HYDRANT AT 24" ABOVE FINAL GRADE.

3 – SEAL ALL PIPE PENETRATIONS OF EXTERIOR WALLS.

4 – MAINTAIN REQUIRED CLEARANCES IN FRONT OF AND DIRECTLY OVER ELECTRICAL PANELS AND EQUIPMENT.

5 – INSTALL ALL DRAINAGE PIPING (STORM AND SANITARY) AS HIGH AS POSSIBLE.

6 – SEAL ALL DUCT AND PIPE OPENINGS THRU EXTERIOR WALL WEATHERTIGHT.

7 – MOUNT ALL VALVES IN ACCESSIBLE LOCATIONS.

8 – PIPING SHOWN AWAY FROM WALLS FOR CLARITY ONLY. SECURELY RACK PIPING ON WALLS WHERE POSSIBLE.

9 – COORDINATE TYPE OF COMPRESSED AIR OUTLETS WITH OWNER.

10 – PROVIDE SHUT-OFF VALVES ON ALL BRANCH PIPING TAKE-OFFS FROM MAIN.

11 – VERIFY CORRECT WALL THICKNESS FOR ALL WALL HYDRANTS.

12 – FOR PIPING BELOW THIS LEVEL SEE SHEET M07.

13 – FOR PIPING NORTH OF THIS LEVEL SEE SHEET M10.

NUMBERED NOTES:

(1) 2" CA UP FROM BELOW. MAKE 2" VALVED CONNECTION TO "AIR BLOW". VERIFY EXACT CONNECTION SIZE AND LOCATION.

(2) 3/4" DCA UP FROM BELOW. MAKE 3/4" VALVED CONNECTION TO PRESS SOLENOID VALVE CONTROL PANEL. VERIFY EXACT SIZE AND LOCATION.

(3) 1" CA UP FROM BELOW. MAKE 1" VALVED CONNECTION TO "CORE BLOW". VERIFY EXACT SIZE AND LOCATION.

(4) 1" DCA DOWN THRU MEZZANINE FLOOR. CONNECT COMPRESSED AIR TO THREE (3) KNIFE GATE VALVE ACTUATORS. REFER TO DETAIL 5/M23 FOR CONFIGURATION.

WENTZ ASSOCIATES INC
CONSULTING ENGINEERS
7225 OHMS LANE - STE 160
EDINA, MINNESOTA 55439
PHONE: 952/831-1180
FAX: 952/831-2179
EMAIL: info@wentzassoc.com
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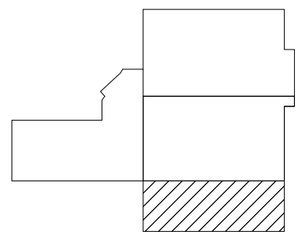
NO.	DATE	REVISION	APPROVED
2	5-20-11	ADDENDUM	DAS

ADDENDUM

FAIRMONT WATER TREATMENT
CITY OF FAIRMONT
FAIRMONT, MINNESOTA

CHEMICAL UNLOADING GARAGE - OPERATIONS LEVEL - PLUMBING PLAN

KEYPLAN



FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN DAJ
CHECKED / APPROVED DAS / DAS
DATE MAY, 2011
PROJECT NUMBER P05194-2008-00
SHEET 14 of 132

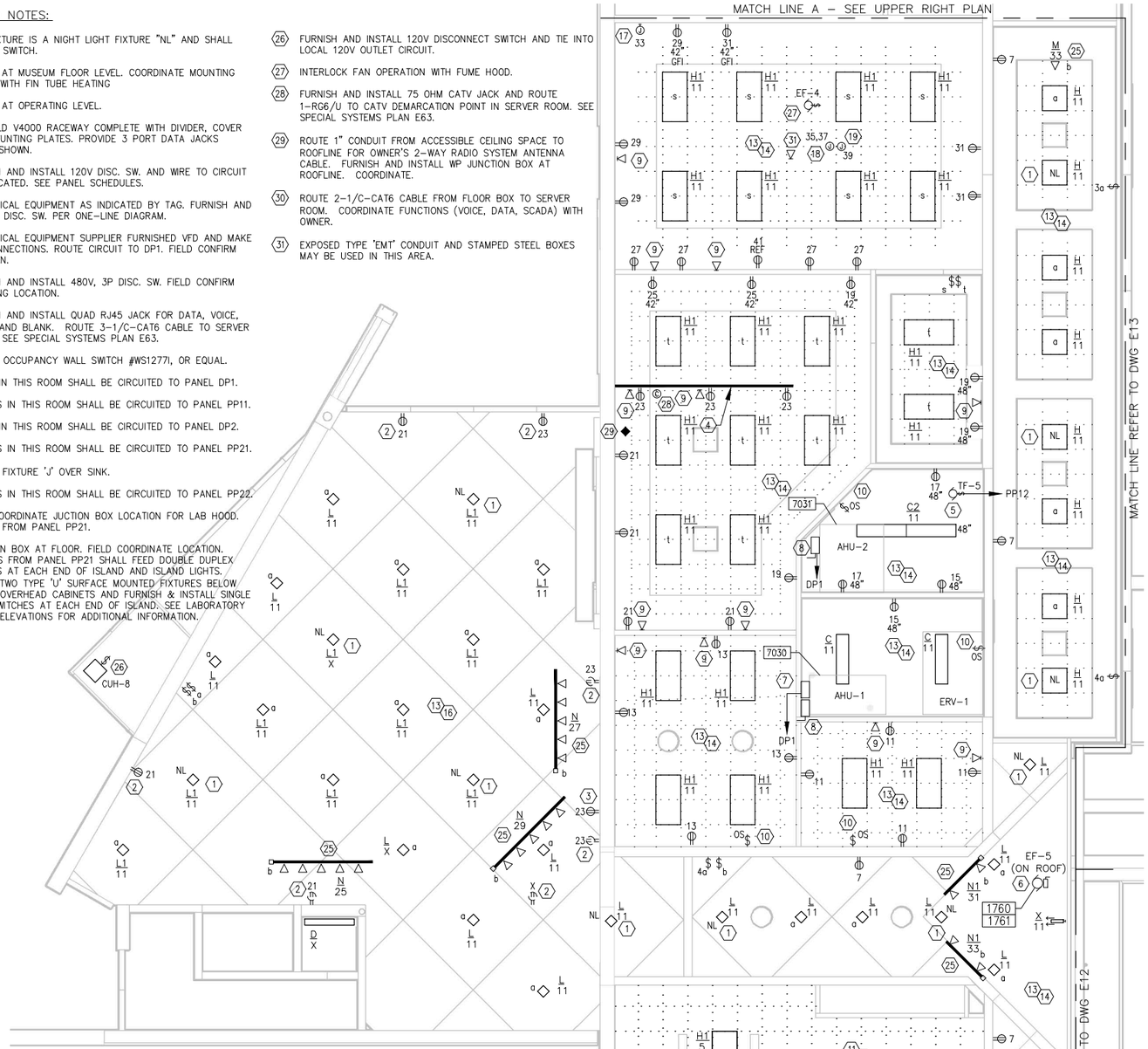
M11

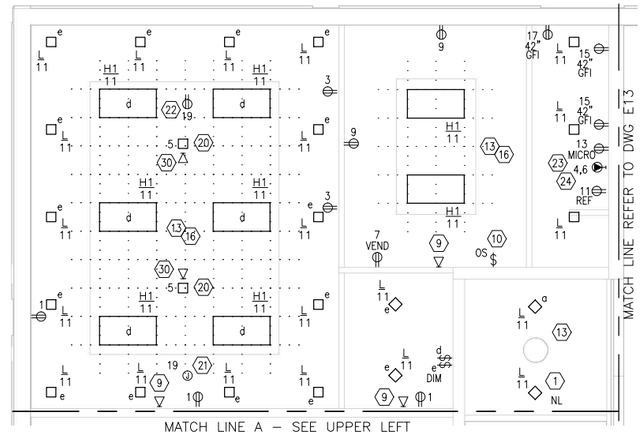
Plotted: By: Dave Jennings Date: Friday, May 20, 2011
Last Saved: By: Dave Jennings Date: Thursday, May 19, 2011 4:31:05 PM
Created: By: ---- Date: Friday, March 04, 2011

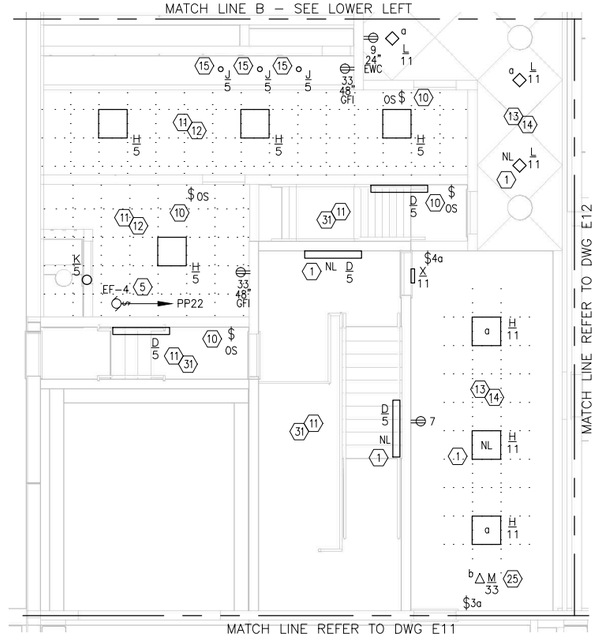
Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
File: O:\cad\KA\current projects\CURRENT DRAWINGS\BARR\23461016 Fairmont WTP_ADDENDUM DWGS 5-19-11\23461016X.dwg
Plotted: By: Mark R. Betros Date: Friday, May 20, 2011
Last Saved: By: Mark R. Betros Date: Thursday, May 19, 2011 5:28:36 PM
Created: By: ---- Date: Thursday, May 19, 2011

NUMBERED NOTES:

1. THIS FIXTURE IS A NIGHT LIGHT FIXTURE "NL" AND SHALL NOT BE SWITCH.
2. OUTLET AT MUSEUM FLOOR LEVEL. COORDINATE MOUNTING HEIGHT WITH FIN TUBE HEATING
3. OUTLET AT OPERATING LEVEL.
4. WIREMOLD V4000 RACEWAY COMPLETE WITH DIVIDER, COVER AND MOUNTING PLATES. PROVIDE 3 PORT DATA JACKS WHERE SHOWN.
5. FURNISH AND INSTALL 120V DISC. SW. AND WIRE TO CIRCUIT AS INDICATED. SEE PANEL SCHEDULES.
6. MECHANICAL EQUIPMENT AS INDICATED BY TAG. FURNISH AND INSTALL DISC. SW. PER ONE-LINE DIAGRAM.
7. MECHANICAL EQUIPMENT SUPPLIER FURNISHED VFD AND MAKE ALL CONNECTIONS. ROUTE CIRCUIT TO DP1. FIELD CONFIRM LOCATION.
8. FURNISH AND INSTALL 480V, 3P DISC. SW. FIELD CONFIRM MOUNTING LOCATION.
9. FURNISH AND INSTALL QUAD RJ45 JACK FOR DATA, VOICE, SCADA AND BLANK. ROUTE 3-1/C-CAT6 CABLE TO SERVER ROOM. SEE SPECIAL SYSTEMS PLAN E63.
10. HUBBEL OCCUPANCY WALL SWITCH #WS1277I, OR EQUAL.
11. LIGHTS IN THIS ROOM SHALL BE CIRCUITED TO PANEL DP1.
12. OUTLETS IN THIS ROOM SHALL BE CIRCUITED TO PANEL PP11.
13. LIGHTS IN THIS ROOM SHALL BE CIRCUITED TO PANEL DP2.
14. OUTLETS IN THIS ROOM SHALL BE CIRCUITED TO PANEL PP21.
15. CENTER FIXTURE 'J' OVER SINK.
16. OUTLETS IN THIS ROOM SHALL BE CIRCUITED TO PANEL PP22.
17. FIELD COORDINATE JUCTION BOX LOCATION FOR LAB HOOD. CIRCUIT FROM PANEL PP21.
18. JUNCTION BOX AT FLOOR. FIELD COORDINATE LOCATION. CIRCUITS FROM PANEL PP21 SHALL FEED DOUBLE DUPLEX OUTLETS AT EACH END OF ISLAND AND ISLAND LIGHTS. MOUNT TWO TYPE 'U' SURFACE MOUNTED FIXTURES BELOW ISLAND OVERHEAD CABINETS AND FURNISH & INSTALL SINGLE POLE SWITCHES AT EACH END OF ISLAND. SEE LABORATORY ISLAND ELEVATIONS FOR ADDITIONAL INFORMATION.
19. JUNCTION BOX AT FLOOR. FIELD COORDINATE LOCATION. CIRCUIT FROM PANEL PP21 SHALL FEED WATER PUMP AT ISLAND.
20. STEEL CITY, POKE-THROUGH, FLUSH FLOOR BOX FPT3 SERIES, OR EQUAL. FIELD COORDINATE LOCATIONS.
21. PROVIDE JUNCTION ABOVE CEILING FOR MOTORIZED SCREEN. FIELD COORDINATE LOCATION.
22. OUTLET LOCATED IN CEILING TILE FOR CEILING MOUNTED PROJECTOR. FIELD COORDINATE LOCATION.
23. FIELD VERIFY MOUNTING HEIGHT OF MICROWAVE RECEPTACLE.
24. 208V NEMA 14-50R RECEPTACLE FOR RANGE. ROUTE 3-1/C-#6 & 1-1/C-#8 GND-3/4" TO PP22.
25. TRACK LIGHT SHALL BE CIRCUITED FROM PANEL PP22.
26. FURNISH AND INSTALL 120V DISCONNECT SWITCH AND TIE INTO LOCAL 120V OUTLET CIRCUIT.
27. INTERLOCK FAN OPERATION WITH FUME HOOD.
28. FURNISH AND INSTALL 75 OHM CATV JACK AND ROUTE 1-RG6/U TO CATV DEMARCATION POINT IN SERVER ROOM. SEE SPECIAL SYSTEMS PLAN E63.
29. ROUTE 1" CONDUIT FROM ACCESSIBLE CEILING SPACE TO ROOFLINE FOR OWNER'S 2-WAY RADIO SYSTEM ANTENNA CABLE. FURNISH AND INSTALL WP JUNCTION BOX AT ROOFLINE. COORDINATE.
30. ROUTE 2-1/C-CAT6 CABLE FROM FLOOR BOX TO SERVER ROOM. COORDINATE FUNCTIONS (VOICE, DATA, SCADA) WITH OWNER.
31. EXPOSED TYPE 'EMT' CONDUIT AND STAMPED STEEL BOXES MAY BE USED IN THIS AREA.







GENERAL NOTES:

1. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAY OR ON BUILDING EXTERIOR. CAST CONDUIT IN FLOOR SLAB WHERE POSSIBLE.
2. CAST-IN-PLACE CONDUIT, WHEN COMPLETE CAST IN CONCRETE, MAY BE SCHEDULE 80 PVC CONDUIT. PROVIDE GROUND CONDUCTOR PER N.E.C. CONDUIT WHICH IS PARTIALLY CAST-IN-PLACE SHALL BE GALVANIZED RIGID STEEL OR AS OTHERWISE SCHEDULED.
3. FIELD COORDINATE WIRING AND EXACT DEVICE LOCATIONS WITH EQUIPMENT SUPPLIERS AND/OR ENGINEER.
4. SEE CABLE AND CONDUIT SCHEDULE FOR WIRING REQUIREMENTS. ALL EQUIPMENT ROUGH-IN AND WIRING SHALL BE CONFIRMED WITH EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION.
5. COORDINATE THE INSTALLATION OF BELOW-GRADE AND CAST-IN-PLACE CONDUIT WITH OTHER TRADES.

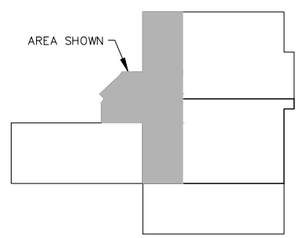
GENERAL NOTES (CONT'D):

6. EQUIPMENT LOCATION IS APPROXIMATE. CONTRACTOR SHALL FIELD COORDINATE MOUNTING LOCATION AND SHALL ENSURE N.E.C. REQUIRED CLEARANCES ARE MET.
7. SEE ARCHITECTURAL, MECHANICAL, AND PROCESS DRAWINGS FOR ADDITIONAL INFORMATION.
8. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAYS OR EXPOSED ON BUIDING EXTERIORS. INTERIOR CONDUITS SHALL BE ROUTED UNDER FLOORS OR INSIDE WALLS WHERE POSSIBLE.
9. CIRCUITS BETWEEN MOTOR CONTROL CENTERS, CONTROL PANELS AND FIELD EQUIPMENT ARE NOT ALL SHOWN ON PLAN. SEE CABLE AND CONDUIT SCHEDULE, ONE-LINE DIAGRAM, AND SCHEMATICS.
10. ALL CONDUITS SHALL BE CONCEALED IN THESE AREAS UNLESS NOTED OTHERWISE. CONCEALED CONDUITS MAY BE 'EMT'. USE FLUSH STAMPED-STEEL BOXES. WHERE CONCEALED INSTALLATION IS NOT POSSIBLE, USE WIREMOLD, OR EQUAL SURFACE RACEWAY SYSTEM ONLY AS APPROVED BY FIELD ENGINEER.

OPERATIONS LEVEL LIGHTING PLAN

SCALE 0 1 5 10

KEYPLAN



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NO.	DATE	REVISION	APPROVED
1	5-19-11	ADDENDUM 2	PJL

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

OPERATIONS LEVEL - LIGHTING PLAN

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	ADDENDUM
TECHNICIAN	MRB2
CHECKED / APPROVED	PJL
DATE	MAY., 2011
PROJECT NUMBER	P05194-2008-00
SHEET	1 of 6

E14

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POWER PANEL--PP5

MOUNTING	LOCATION	BUS				REMARKS
		AMPS	VOLTS	PHASE	WIRE	
SURFACE	RAW WATER INTAKE STATION	200	120/208	3	4	1. 150A/3P MAIN CIRCUIT BREAKER 2. ISOLATED GROUND BUS

CIRCUIT DESCRIPTION	BKR	CKT	ANTICIPATED LOAD IN VA	PHASE A	PHASE B	PHASE C	ANTICIPATED LOAD IN VA	CKT	BKR	CIRCUIT DESCRIPTION
LIGHTS	20A1P	1	700	■			600	2	20A1P	RAW WATER CONTROL PANEL RWCP01
OUTLETS	20A1P	3	600		■		500	4	20A1P	DEEP INTAKE RAW WATER SAMPLING PUMP
SPARE	20A1P	5	----			■	500	6	20A1P	SHALLOW INTAKE RAW WATER SAMPLING PUMP
SPARE	20A1P	7	----	■			100	8	20A1P	BLOWER AIR FLOW TRANSMITTER
SPARE	20A1P	9	----		■		----	10	20A1P	SPARE
SPACE	----	11	----			■	----	12	20A1P	SPARE
SPACE	----	13	----	■			----	14	----	SPACE
SPACE	----	15	----		■		----	16	----	SPACE
SPACE	----	17	----			■	----	18	----	SPACE
SPACE	----	19	----	■			----	20	----	SPACE
SPACE	----	21	----		■		----	22	----	SPACE
SPACE	----	23	----			■	----	24	----	SPACE
SPACE	----	25	----	■			----	26	----	SPACE
SPACE	----	27	----		■		----	28	----	SPACE
SPACE	----	29	----			■	----	30	----	SPACE
SPACE	----	31	----	■			----	32	----	SPACE
SPACE	----	33	----		■		----	34	----	SPACE
SPACE	----	35	----			■	----	36	----	SPACE
SPACE	----	37	----	■			----	38	----	SPACE
SPACE	----	39	----		■		----	40	----	SPACE
SPACE	----	41	----			■	----	42	----	SPACE

UPS POWER PANEL--PPUPS

MOUNTING	LOCATION	BUS				REMARKS
		AMPS	VOLTS	PHASE	WIRE	
WALL	ELECTRICAL ROOM ROOM 332	100	120/208	3	4	70A MAIN BREAKER

CIRCUIT DESCRIPTION	BKR	CKT	ANTICIPATED LOAD IN VA	PHASE A	PHASE B	PHASE C	ANTICIPATED LOAD IN VA	CKT	BKR	CIRCUIT DESCRIPTION
NWP-01	20A1P	1	500	■			500	2	20A1P	VCP2010
MCP-01	20A1P	3	500		■		500	4	20A1P	VCP2015
CCP-01	20A1P	5	500			■	500	6	20A1P	VCP2020
FCP-01	20A1P	7	500	■			500	8	20A1P	VCP2040
FCP-01	20A1P	9	500		■		500	10	20A1P	VCP2210
TELEPHONE BOARD	20A1P	11	200			■	500	12	20A1P	VCP2220
COMMUNICATIONS RACK	20A1P	13	200	■			500	14	20A1P	VCP2300
WTP POLLING MASTER	20A1P	15	500		■		500	16	20A1P	VCP3601
OFFICE UPS OUTLETS	20A1P	17	600			■	500	18	20A1P	VCP3602
OFFICE UPS OUTLETS	20A1P	19	600	■			----	20	20A1P	SPARE
OFFICE UPS OUTLETS	20A1P	21	600		■		----	22	20A1P	SPARE
SPARE	20A1P	23	----			■	----	24	20A1P	SPARE
SPARE	20A1P	25	----	■			----	26	20A1P	SPARE
SPARE	20A1P	27	----		■		----	28	20A1P	SPARE
SPARE	20A1P	29	----			■	----	30	20A1P	SPARE

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SIGNATURE: Patrick J. Lehnherr

TYPED NAME: PATRICK J. LEHNHERR

APRIL 29, 2011 REG. NO. 25033

NO.	DATE	REVISION	APPROVED
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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

ELECTRICAL SCHEDULES

FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN CML
CHECKED / APPROVED PJL
DATE MAY., 2011
PROJECT NUMBER P05194-2008-00
SHEET 2 of 6

E50

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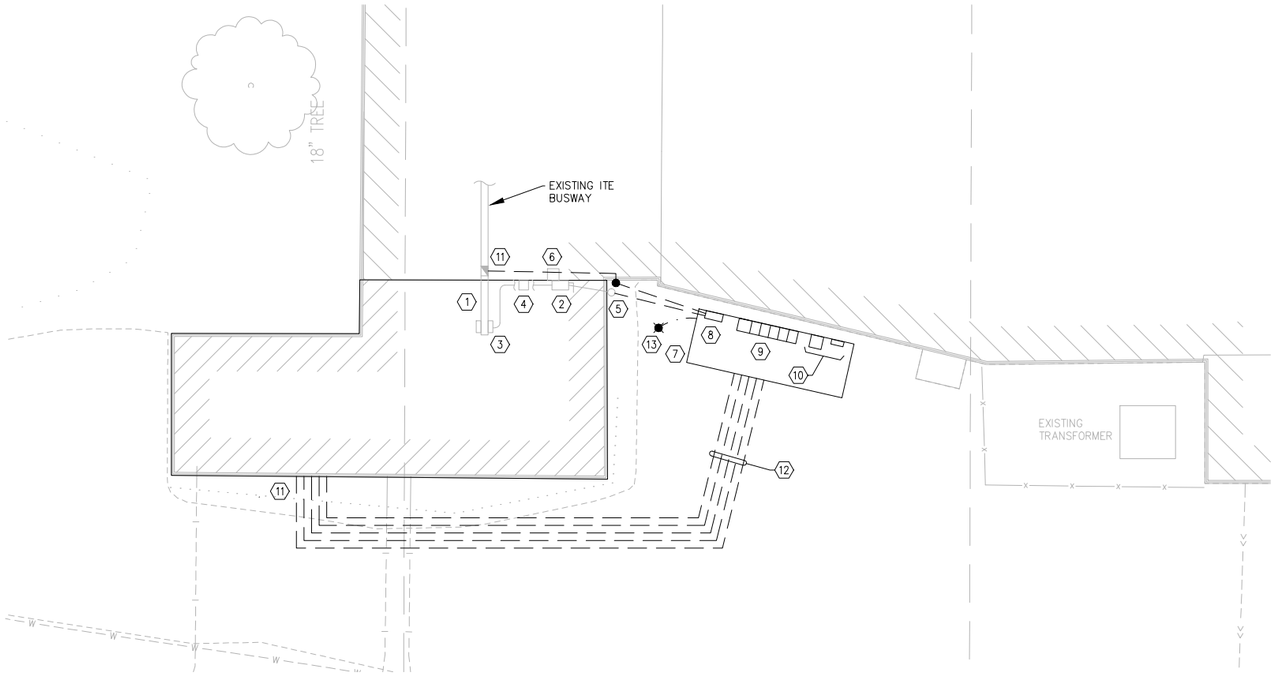

RWIS – TEMPORARY POWER PLAN

0 10 20
SCALE IN FEET

GENERAL NOTES:

1. SHALL REMOVE ALL EXISTING ELECTRICAL EQUIPMENT IN THE RAW WATER INTAKE STRUCTURE IN SUPPPORT OF THE BUILDING REHABILITATION AS DESCRIBED ON SHEETS P19 THROUGH P21.
2. PROVIDE ALL EQUIPMENT, WIRING, JUNCTION BOXES, CONNECTIONS AND APPURTANCES NECESSARY FOR CONTINUED OPERATION OF THE EXISTING WATER TREATMENT PLANT DURING ALL PHASES OF CONSTRUCTION AND NEW WTP STARTUP.
3. TEMPORARY INSTALLATION SHALL COMPLY WITH N.E.C.
4. CONTRACTOR SHALL SIZE ALL CABLE, CONDUIT, AND JUNCTION BOXES PER N.E.C.
5. MOTOR CONTROL CENTER, LIGHTING PANEL, AND TRANSFORMER USED FOR TEMPORARY INSTALLATION MAY BE USED FOR THE PERMANENT INSTALLATION PROVIDED EQUIPMENT IS KEPT IN 'LIKE NEW' CONDITION DURING CONSTRUCTION. WARRANTY PERIOD AS REQUIRED IN DIVISION 1 SHALL NOT BE REDUCED DUE TO USE IN TEMPORARY INSTALLATION.
6. COORDINATE TEMPORARY ELECTRICAL INSTALLATION WITH OVERALL RWIS STRUCTURE REHABILITATION REQUIREMENTS AND STAGING. INSTALLATION SHOWN ON THIS SHEET IS INTENDED TO SUPPORT DEEP INTAKE OPERATION WHILE SHALLOW INTAKE IS BEING REHABILITATED. ADDITIONAL STAGES OF ELECTRICAL WORK BEFORE AND AFTER THIS POINT MAY BE REQUIRED AND SHALL BE THE INCLUDED IN THE BID.
7. FIELD ROUTE ALL CONDUIT.
8. TEMPORARY ELECTRICAL INSTALLATION MAY BE USED FOR CONSTRUCTION POWER, HOWEVER PROVISIONS FOR CONSTRUCTION POWER ARE NOT SHOWN AND SHALL BE PROVIDED BY CONTRACTOR.

NUMBERED NOTES:

(1) EXISTING 'ITE' BUSWAY. PORTION INSIDE RWIS TO BE REMOVED.

(2) EXISTING 400A SERVICE ENTRANCE DISCONNECT SWITCH TO BE REMOVED AFTER NEW DISCONNECT IS INSTALLED SEE NUMBERED NOTE 8.

(3) EXISTING JUNCTION BOX TO BE REMOVED.

(4) EXISTING 10KVA TRANSFORMER TO BE RELOCATED TO EXISTING LIME FEED ROOM IN EXISTING WTP. FIELD COORDINATE LOCATION. RECONNECT PRIMARY TO EXISTING DISCONNECT AT 'ITE' BUSWAY IN LIME FEED ROOM. RECONNECT SECONDARY TO EXISTING PANEL IN LIME FEED ROOM.

(5) EXISTING SERVICE ENTRANCE CONDUIT. INTERCEPT EXISTING SERVICE ENTRANCE AND ROUTE TO FUSED DISCONNECT IN ELECTRICAL EQUIPMENT ENCLOSURE. SEE NUMBERED NOTE 8.

(6) EXISTING PANEL IN LIME FEED ROOM TO REMAIN. RECONNECT TO EXISTING RELOCATED TRANSFORMER.

(7) PROVIDE WEATHERIZED, SECURE, ELECTRICAL EQUIPMENT ENCLOSURE WITH HEAT, AIR CONDITIONING, LIGHTS, OUTLETS AND SUFFICIENT WORKING CLEARANCE.

(8) 400A, 480V, 3POLE, NEMA 1, FUSED, HEAVY-DUTY DISCONNECT. INTERCEPT EXISTING 400A SERVICE ENTRANCE LATERAL AND FEED THIS DISCONNECT, THEN CONNECT THE OUTPUT OF THIS DISCONNECT TO BOTH THE EXISTING 'ITE' BUSWAY AND THE NEW MOTOR CONTROL CENTER.

(9) MOTOR CONTROL CENTER TO INCLUDE ALL VFDS, STARTERS AND BREAKERS NECESSARY FOR OPERATION OF THE DEEP INTAKE. PUMPS AND BLOWER SHALL OPERATE IN THE MANUAL MODE DURING CONSTRUCTION. MCC SECTIONS SHALL BE RELOCATED TO THE PERMANENT LOCATION IN THE SHALLOW INTAKE STRUCTURE AFTER THAT REHABILITATION IS COMPLETE.

(10) POWER PANEL AND POWER PANEL TRANSFORMER. PANEL AND TRANSFORMER SHALL BE RELOCATED TO THE PERMANENT LOCATION IN THE SHALLOW INTAKE STRUCTURE AFTER THAT REHABILITATION IS COMPLETE.

(11) REPOWER EXISTING 'ITE' BUSWAY FROM NEW 400A DISCONNECT SWITCH. COORDINATE REQUIREMENTS FOR CONNECTING TO BUSWAY.

(12) VFD OUTPUT CIRCUITS SHALL BE ROUTED IN GALVANIZED RIGID STEEL. ALL OTHER CONDUIT MAY BE SCHEDULE 80 PVC. CONTRACTOR SHALL ROUTE CONDUIT AS REQUIRED TO AVOID DEMOLITION AND CONSTRUCTION ACTIVITY.

(13) PROVIDE GROUNDING ELECTRODE CONDUCTOR AND GROUND ROD AS REQUIRED BY N.E.C..

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SIGNATURE: _____

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

RWIS - TEMPORARY POWER PLAN

FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN CML
CHECKED / APPROVED PJL
DATE MAY., 2011
PROJECT NUMBER P05194-2008-00
SHEET 3 of 6

E60

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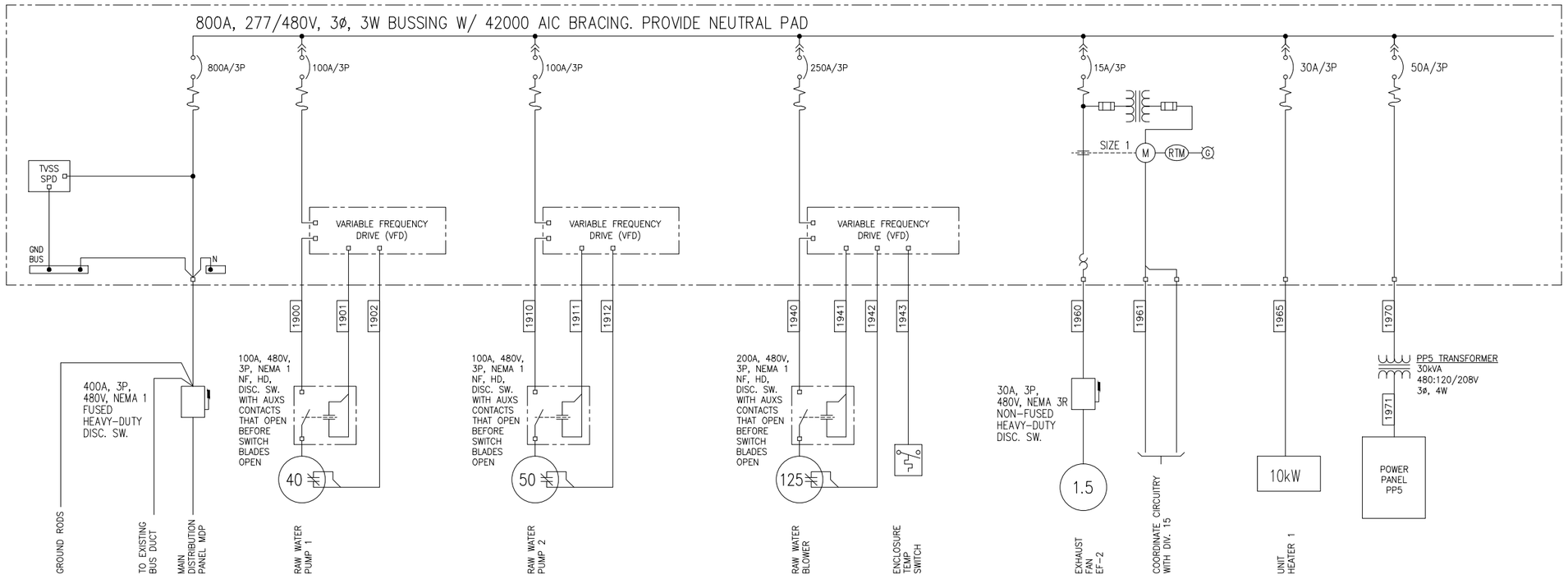

MOTOR CONTROL CENTER RWIS MCC ONE-LINE DIAGRAM – TEMPORARY POWER
NO SCALE

EQUIPMENT & CIRCUITS SHOWN REPRESENT MINIMUM REQUIREMENT FOR TEMPORARY POWER OF RWIS DEEP INTAKE STRUCTURE.

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

MOTOR CONTROL CENTER RWIS MCC ONE-LINE DIAGRAM - TEMPORARY

FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN CML
CHECKED / APPROVED PJL
DATE MAY., 2011
PROJECT NUMBER P05194-2008-00
SHEET 4 of 6

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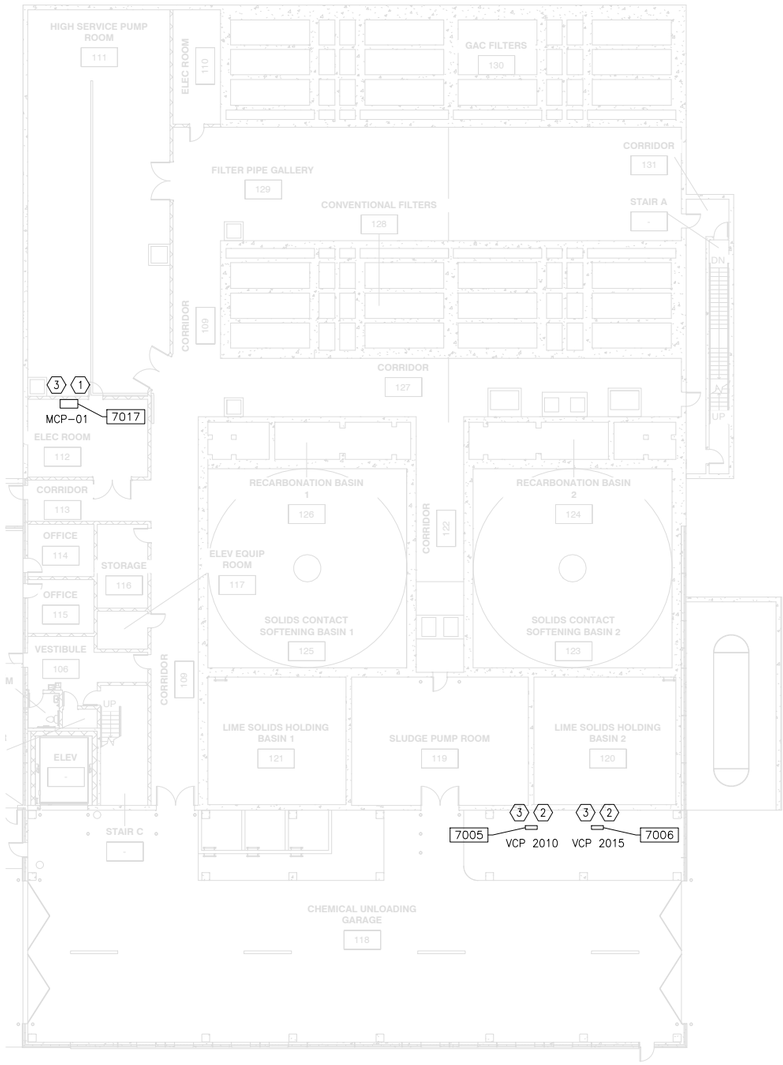

SPECIAL SYSTEMS PLANS – GALLERY LEVEL

SCALE 0 5 10 20 30

GENERAL NOTES:

1. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAY OR ON BUILDING EXTERIOR. CAST CONDUIT IN FLOOR SLAB WHERE POSSIBLE.
2. CAST-IN-PLACE CONDUIT, WHEN COMPLETE CAST IN CONCRETE, MAY BE SCHEDULE 80 PVC CONDUIT. PROVIDE GROUND CONDUCTOR PER N.E.C. CONDUIT WHICH IS PARTIALLY CAST-IN-PLACE SHALL BE GALVANIZED RIGID STEEL OR AS OTHERWISE SCHEDULED.
3. FIELD COORDINATE WIRING AND EXACT DEVICE LOCATIONS WITH EQUIPMENT SUPPLIERS AND/OR ENGINEER.
4. SEE CABLE AND CONDUIT SCHEDULE FOR WIRING REQUIREMENTS. ALL EQUIPMENT ROUGH-IN AND WIRING SHALL BE CONFIRMED WITH EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION.
5. COORDINATE THE INSTALLATION OF BELOW-GRADE AND CAST-IN-PLACE CONDUIT WITH OTHER TRADES.
6. EQUIPMENT LOCATION IS APPROXIMATE. CONTRACTOR SHALL FIELD COORDINATE MOUNTING LOCATION AND SHALL ENSURE N.E.C. REQUIRED CLEARANCES ARE MET.
7. SEE ARCHITECTURAL, MECHANICAL, AND PROCESS DRAWINGS FOR ADDITIONAL INFORMATION.
8. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAYS OR EXPOSED ON BUIDING EXTERIORS. INTERIOR CONDUITS SHALL BE ROUTED UNDER FLOORS OR INSIDE WALLS WHERE POSSIBLE.
9. CIRCUITS BETWEEN MOTOR CONTROL CENTERS, CONTROL PANELS AND FIELD EQUIPMENT ARE NOT ALL SHOWN ON PLAN. SEE CABLE AND CONDUIT SCHEDULE, ONE-LINE DIAGRAM, AND SCHEMATICS.

NUMBERED NOTES:

(1) ROUTE 2-1/C-#10+GND-3/4" FROM PANEL TO CENTRAL UPS SYSTEM. THIS POWER IS IN ADDITION TO THE NORMAL 120V POWER FEED.

(2) ROUTE 2-1/C-#12+GND-3/4" FROM PANEL TO CENTRAL UPS SYSTEM. THIS POWER IS IN ADDITION TO THE NORMAL 120V POWER FEED.

(3) ROUTE 3-CAT6 WIRES IN 1" CONDUIT FROM PANEL TO SERVER ROOM FOR TELEPHONE, INTERNET AND SCADA COMMUNICATIONS. COORDINATE AVAILABLE CONNECTIONS WITH EQUIPMENT SUPPLIER AND MAKE CONNECTIONS.

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AE2S

ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

GALLERY LEVEL - SPECIAL SYSTEMS PLAN

FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN SBH
CHECKED / APPROVED PJL
DATE MAY., 2011
PROJECT NUMBER P05194-2008-00
SHEET 5 of 6

E62

Plotted: By: Mark R. Betros Date: Friday, May 20, 2011
Last Saved: By: Mark R. Betros Date: Thursday, May 19, 2011 5:38:17 PM
Created: By: ____ Date: Thursday, May 19, 2011

Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
File: O:\cad\KA\current projects\CURRENT DRAWINGS\BARR\23461016 Fairmont WTP_ADDENDUM DWGS 5-19-11\23461016BU.dwg

NUMBERED NOTES:

(1) ROUTE 2-1/C-#10+GND-3/4" FROM PANEL TO CENTRAL UPS SYSTEM. THIS POWER IS IN ADDITION TO THE NORMAL 120V POWER FEED.

(2) ROUTE 2-1/C-#12+GND-3/4" FROM PANEL TO CENTRAL UPS SYSTEM. THIS POWER IS IN ADDITION TO THE NORMAL 120V POWER FEED.

(3) FURNISH AND INSTALL ORANGE UPS DUPLEX RECEPTACLE. ROUTE 2-1/C-#10-3/4" TO UPS PANEL. UP TO THREE DUPLEX RECEPTACLES MAY BE ON A SINGLE HOME RUN. MOUNTING HEIGHT TO MATCH NORMAL 120V OUTLETS.

(4) 15KVA (MINIMUM), 120/208V, 3PH, TRUE ON-LINE UNINTERRUPTIBLE POWER SYSTEM WITH IGBT PWM INVERTER, INTERNAL BATTERY PACK WITH 20 MINUTE RUN TIME AT FULL LOAD. CHLORIDE EDP70PLUS/24/18-2X2 WITH PACK 106, OR EQUAL.

(5) ROUTE 3-CAT6 WIRES IN 1" CONDUIT FROM PANEL TO SERVER ROOM FOR TELEPHONE, INTERNET AND SCADA COMMUNICATIONS. COORDINATE AVAILABLE CONNECTIONS WITH EQUIPMENT SUPPLIER AND MAKE CONNECTIONS.

(6) PROVIDE 48" X 24" X 3/4" PLYWOOD MOUNTING BOARD FOR CABLE TELEVISION (CATV) DEMARCATION POINT WITH TWO COATS GREY FIRE RESISTANT PAINT. MOUNT TOP AT 72". MOUNT THE FOLLOWING COMPONENTS ON THE MOUNTING BOARD:

A. 4-WAY SPLITTER WITH THREE 75-OHM TERMINATING RESISTOR CAPS, FOURTH PORT TO BE USED.

B. 2" CONDUIT WITH NYLON PULL ROPE TO PROPERTY LINE FOR CATV UTILITY USE.

(7) PROVIDE 48" X 48" X 3/4" PLYWOOD MOUNTING BOARD FOR TELEPHONE DEMARCATION POINT WITH TWO COATS GREY FIRE RESISTANT PAINT. MOUNT TOP AT 72". MOUNT THE FOLLOWING COMPONENTS ON THE MOUNTING BOARD:

A. PROVIDE TWO ORANGE DUPLEX RECEPTACLES MOUNTED AT 66" ON A DEDICATED 120V, 20A UPS CIRCUIT. ROUTE 2-1/C-#10+GND-3/4" TO UPS PANEL.

B. PROVIDE 1" X 24" X 1/4" THICK COPPER GROUND BAR ON STANDOFFS FOR MINIMUM 1/2" CLEARANCE FROM MOUNTING BOARD. MOUNT AT 30"

C. PROVIDE #6 COPPER GROUND CONDUCTOR FROM SERVICE GROUND TO SERVER ROOM GROUND BAR.

D. PROVIDE 66-BLOCK FOR TERMINATION OF TELEPHONE UTILITY COPPER CONDUCTORS

E. PROVIDE FIXED WALL MOUNT RACK, 35"H X 19"W X 12"D WITH TWO ORANGE DUPLEX RECEPTACLES ON DEDICATED 120V, 20A UPS CIRCUIT (IN ADDITION TO ITEM A). ROUTE 2-1/C-#10+GND-3/4" TO UPS PANEL.

F. PROVIDE TWO 48-PORT PATCH PANELS IN WALL RACK, EACH WITH 48 CATEGORY 5e RJ45 JACKS. ONE PANEL FOR DATA AND ONE PANEL FOR VOICE. PATCH PANEL JACKS SHALL BE LABELED PER REMOTE JACK NUMBER.

G. BOND RACK TO GROUND BAR WITH #6 COPPER CONDUCTOR.

H. COORDINATE INSTALLATION WITH TELEPHONE AND INTERNET COMPANIES.

I. PROVIDE TWO 2½" X 2½" WIRE MANAGEMENT SYSTEM FROM TOP OF PLYWOOD INTO CEILING CAVITY ABOVE TELEPHONE MOUNTING BOARD.

J. PROVIDE 4" CONDUIT WITH NYLON PULL ROPE TO PROPERTY LINE FOR TELEPHONE UTILITY USE.

K. PROVIDE 2" CONDUIT WITH NYLON PULL ROPE TO PROPERTY LINE FOR INTERNET PROVIDER USE.

L. ALL COMPONENTS SHALL BE AS MANUFACTURED BY PANDUIT, HUBBELL OR AMP.

NUMBERED NOTES:

(8) DATA/VOICE/SCADA JACKS AND CABLING LOCATED THROUGHOUT STRUCTURE

A. ALL JACKS SHALL BE SUITABLE FOR CATEGORY 5e USE. VOICE JACKS SHALL BE YELLOW, DATA JACKS SHALL BE BLUE, AND SCADA JACKS SHALL BE RED, UNLESS DIRECTED OTHERWISE BY OWNER.

B. ALL JACKS SHALL BE LABELED WIHT ROOM NUMBER ADN SEQUENCE WITHIN ROOM, IF MORE THAN ONE JACK, AND SHALL HAVE THE PREFIX "D" FOR DATA, "V" FOR VOICE, AND "S" FOR SCADA. JACKS SHALL BE MOUNTED IN STAINLESS STEEL PLATES. GENERAL THREE JACKS AND ONE BLANK AS LOCATED ON THE DRAWINGS, UNLESS NOTED OTHERWISE.

C. ALL CABLES SHALL BE BLUE AND SHALL BE A MINIMUM OF 1-4PAIR-#24 CATEGORY 6 PLENUM RATED CABLE PER JACK. CABLES SHALL BE LABELED WITH ASSOCIATED JACK NUMBER AT ALL JUNCTION BOXES, PATCH PANEL, ADN EVERY 10' IF NOT IN CONDUIT. PROVIDE 6' SERVICE LOOP AT SERVER ROOM AND IN CEILING NEAR JACK WHERE NOT INSTALLED IN CONDUIT.

D. OFFICE AREA CABLING IN ACCESSIBLE CEILINGS MAY BE INSTALLED WITHOUT CONDUIT IF SUPPORTED EVERY 36" FROM STRUCTURE. CABLE IS NOT PERMITTED TO LAY ON CEILING.

E. ALL JACK/CABLE SYSTEMS SHALL BE TESTED PER EIA/TIA STANDARDS AND SHALL BE SUITABLE FOR USE ON 100Mps SYSTEMS. TEST RESULTS SHALL BE PLACED IN DIGITAL FORMAT AND PROVIDED TO THE ENGINEER FOR CONFIRMATION. ANY SYSTEM NOT MEETING THESE STANDARDS SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.

F. CONTRACTOR SHALL PROVIDE PLANS INDICATING JACK NUMBER AS INSTALLED. THESE PLANS SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL.

G. ALL COMPONENTS SHALL BE AS MANUFACTURERED BY PANDUIT, HUBBELL OR AMP.

(9) NETWORK SERVER NWP-01. SEE ECXX SERIES SHEETS. ROUTE 2-1/C-#10+GND-3/4" TO UPS PANEL AND 2-1/C-#12+GND-3/4" TO PP12.

(10) WTP POLLING MASTER. SEE ECXX SERIES SHEETS. ROUTE 2-1/C-#10+GND-3/4" TO UPS PANEL.

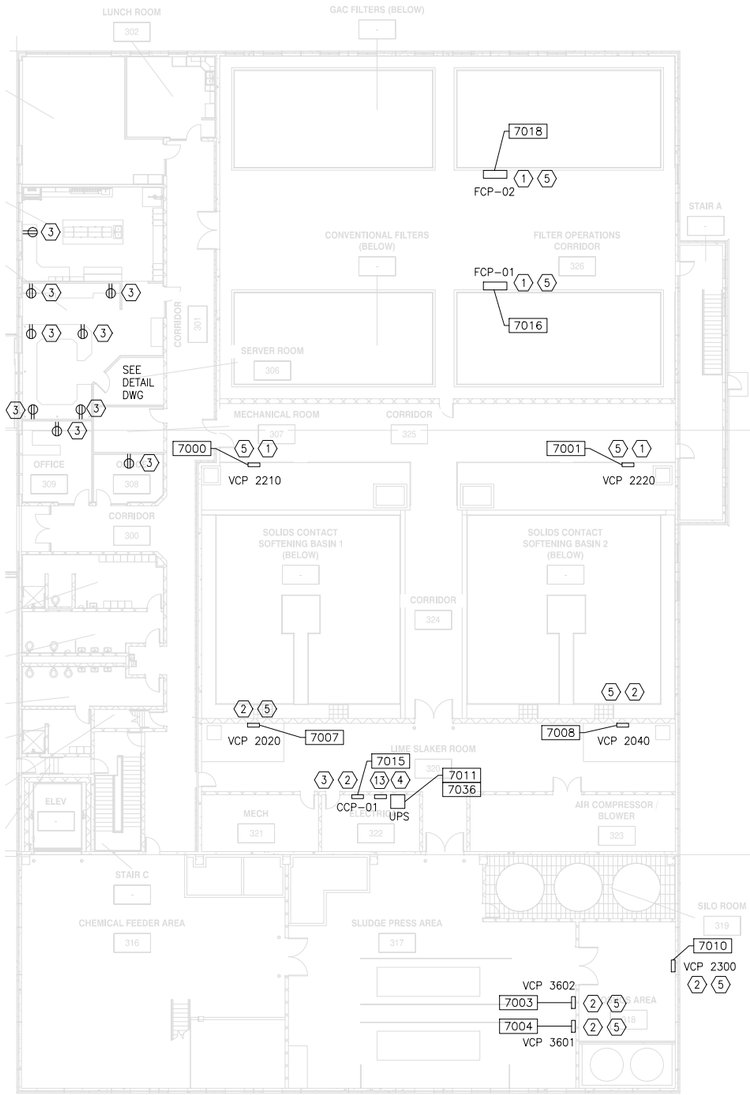
(11) PROVIDE 2" CONDUIT WITH NYLON PULL ROPE TO PROPERTY LINE FOR CITY FIBER OPTIC CABLE.

(12) ROUTE 1" CONDUIT FROM ACCESSIBLE CEILING TO ROOFLINE FOR CITY RADIO SCADA SYSTEM ANTENNA AND FEEDLINE. COORDINATE ANTENNA MOUNTING AT ROOF AND CONNECT FEEDLINE TO WTP POLLING MASTER PANEL.

(13) UPS PANEL PPUPS. ROUTE 4-1/C-#4+GND-1 1/4" TO UPS.

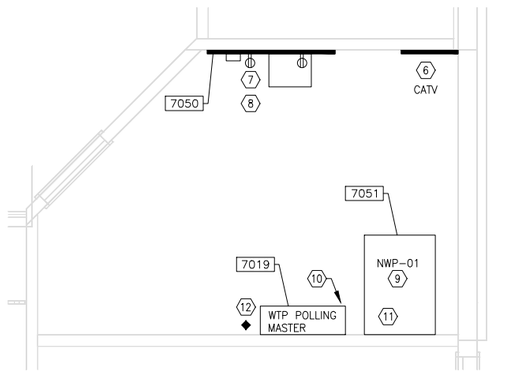
GENERAL NOTES:

1. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAY OR ON BUILDING EXTERIOR. CAST CONDUIT IN FLOOR SLAB WHERE POSSIBLE.
2. CAST-IN-PLACE CONDUIT, WHEN COMPLETE CAST IN CONCRETE, MAY BE SCHEDULE 80 PVC CONDUIT. PROVIDE GROUND CONDUCTOR PER N.E.C. CONDUIT WHICH IS PARTIALLY CAST-IN-PLACE SHALL BE GALVANIZED RIGID STEEL OR AS OTHERWISE SCHEDULED.
3. FIELD COORDINATE WIRING AND EXACT DEVICE LOCATIONS WITH EQUIPMENT SUPPLIERS AND/OR ENGINEER.
4. SEE CABLE AND CONDUIT SCHEDULE FOR WIRING REQUIREMENTS. ALL EQUIPMENT ROUGH-IN AND WIRING SHALL BE CONFIRMED WITH EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION.
5. COORDINATE THE INSTALLATION OF BELOW-GRADE AND CAST-IN-PLACE CONDUIT WITH OTHER TRADES.
6. EQUIPMENT LOCATION IS APPROXIMATE. CONTRACTOR SHALL FIELD COORDINATE MOUNTING LOCATION AND SHALL ENSURE N.E.C. REQUIRED CLEARANCES ARE MET.
7. SEE ARCHITECTURAL, MECHANICAL, AND PROCESS DRAWINGS FOR ADDITIONAL INFORMATION.
8. FIELD CONFIRM ALL CONDUIT ROUTING. DO NOT ROUTE CONDUITS ACROSS WALKWAYS OR EXPOSED ON BUIDING EXTERIORS. INTERIOR CONDUITS SHALL BE ROUTED UNDER FLOORS OR INSIDE WALLS WHERE POSSIBLE.
9. CIRCUITS BETWEEN MOTOR CONTROL CENTERS, CONTROL PANELS AND FIELD EQUIPMENT ARE NOT ALL SHOWN ON PLAN. SEE CABLE AND CONDUIT SCHEDULE, ONE-LINE DIAGRAM, AND SCHEMATICS.



SPECIAL SYSTEMS PLANS – OPERATIONS LEVEL

0 5 10 20 30
SCALE



SERVER ROOM DETAIL DRAWING

0 1 2 3 4 5 6
SCALE

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE:

TYPED NAME: PATRICK J. LEHNHERR

APRIL 29, 2011 REG. NO. 25033

NO.	DATE	REVISION	APPROVED
0	5-19-11	ADDENDUM 2	PJL

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA
OPERATIONS LEVEL - SPECIAL SYSTEMS PLANS

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	ADDENDUM
TECHNICIAN	SBH
CHECKED / APPROVED	PJL
DATE	MAY., 2011
PROJECT NUMBER	P05194-2008-00
SHEET	6 of 6

E63

Plotted: By: Mark R. Betros Date: Friday, May 20, 2011
Last Saved: By: Mark R. Betros Date: Thursday, May 19, 2011 5:26:25 PM
Created: By: ____ Date: Thursday, May 19, 2011

Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0				PROCESSOR							
SLOT 0											
1756-L62											
RACK 0				COMMUNICATIONS MODULE							
SLOT 1											
1756-ENBT											
RACK 0	0	DI	LLF5101	CONVENTIONAL FILTER 1 LOW LEVEL FLOAT		ALARM	NORMAL		120VAC	DI	
SLOT 2	1	DI	HLF5102	CONVENTIONAL FILTER 1 HIGH LEVEL FLOAT		NORMAL	ALARM		120VAC	DI	
1756-IA16	2	DI	PCV5111	CONVENTIONAL FILTER 1 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	3	DI	PCV5111	CONVENTIONAL FILTER 1 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	4	DI	PCV5111	CONVENTIONAL FILTER 1 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	5	DI	PMV5112	CONVENTIONAL FILTER 1 EFFLUENT VALVE IN AUTO					120VAC	DI	
	6	DI	PMV5112	CONVENTIONAL FILTER 1 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	7	DI	PMV5112	CONVENTIONAL FILTER 1 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	8	DI	PMV5114	CONVENTIONAL FILTER 1 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	9	DI	PMV5114	CONVENTIONAL FILTER 1 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	10	DI	PMV5114	CONVENTIONAL FILTER 1 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	11	DI	PMV5115	CONVENTIONAL FILTER 1 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	12	DI	PMV5115	CONVENTIONAL FILTER 1 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	13	DI	PMV5115	CONVENTIONAL FILTER 1 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	14	DI	PCV5116	CONVENTIONAL FILTER 1 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	15	DI	PCV5116	CONVENTIONAL FILTER 1 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
RACK 0	0	DI	PCV5116	CONVENTIONAL FILTER 1 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
SLOT 3	1	DI	PCV5117	CONVENTIONAL FILTER 1 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
1756-IA16	2	DI	PCV5117	CONVENTIONAL FILTER 1 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	3	DI	PCV5117	CONVENTIONAL FILTER 1 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	4	DI	LLF5201	CONVENTIONAL FILTER 2 LOW LEVEL FLOAT					120VAC	DI	
	5	DI	HLF5202	CONVENTIONAL FILTER 2 HIGH LEVEL FLOAT					120VAC	DI	
	6	DI	PCV5211	CONVENTIONAL FILTER 2 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	7	DI	PCV5211	CONVENTIONAL FILTER 2 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	8	DI	PCV5211	CONVENTIONAL FILTER 2 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	9	DI	PMV5212	CONVENTIONAL FILTER 2 EFFLUENT VALVE IN AUTO					120VAC	DI	
	10	DI	PMV5212	CONVENTIONAL FILTER 2 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	11	DI	PMV5212	CONVENTIONAL FILTER 2 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	12	DI	PMV5214	CONVENTIONAL FILTER 2 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	13	DI	PMV5214	CONVENTIONAL FILTER 2 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	14	DI	PMV5214	CONVENTIONAL FILTER 2 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	15	DI	PMV5215	CONVENTIONAL FILTER 2 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
RACK 0	0	DI	PMV5215	CONVENTIONAL FILTER 2 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
SLOT 4	1	DI	PMV5215	CONVENTIONAL FILTER 2 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
1756-IA16	2	DI	PCV5216	CONVENTIONAL FILTER 2 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	3	DI	PCV5216	CONVENTIONAL FILTER 2 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	4	DI	PCV5216	CONVENTIONAL FILTER 2 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	5	DI	PCV5217	CONVENTIONAL FILTER 2 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	6	DI	PCV5217	CONVENTIONAL FILTER 2 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	7	DI	PCV5217	CONVENTIONAL FILTER 2 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	8	DI	LLF5301	CONVENTIONAL FILTER 3 LOW LEVEL FLOAT					120VAC	DI	
	9	DI	HLF5302	CONVENTIONAL FILTER 3 HIGH LEVEL FLOAT					120VAC	DI	
	10	DI	PCV5311	CONVENTIONAL FILTER 3 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	11	DI	PCV5311	CONVENTIONAL FILTER 3 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	12	DI	PCV5311	CONVENTIONAL FILTER 3 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	13	DI	PMV5312	CONVENTIONAL FILTER 3 EFFLUENT VALVE IN AUTO					120VAC	DI	
	14	DI	PMV5312	CONVENTIONAL FILTER 3 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	15	DI	PMV5312	CONVENTIONAL FILTER 3 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
RACK 0	0	DI	PMV5314	CONVENTIONAL FILTER 3 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
SLOT 5	1	DI	PMV5314	CONVENTIONAL FILTER 3 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
1756-IA16	2	DI	PMV5314	CONVENTIONAL FILTER 3 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	3	DI	PMV5315	CONVENTIONAL FILTER 3 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	4	DI	PMV5315	CONVENTIONAL FILTER 3 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	5	DI	PMV5315	CONVENTIONAL FILTER 3 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	6	DI	PCV5316	CONVENTIONAL FILTER 3 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	7	DI	PCV5316	CONVENTIONAL FILTER 3 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	8	DI	PCV5316	CONVENTIONAL FILTER 3 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	9	DI	PCV5317	CONVENTIONAL FILTER 3 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	10	DI	PCV5317	CONVENTIONAL FILTER 3 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	11	DI	PCV5317	CONVENTIONAL FILTER 3 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	12	DI	LLF5401	CONVENTIONAL FILTER 4 LOW LEVEL FLOAT					120VAC	DI	
	13	DI	HLF5402	CONVENTIONAL FILTER 4 HIGH LEVEL FLOAT					120VAC	DI	
	14	DI	PCV5411	CONVENTIONAL FILTER 4 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	15	DI	PCV5411	CONVENTIONAL FILTER 4 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	

Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0	0	DI	PCV5411	CONVENTIONAL FILTER 4 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
SLOT 6	1	DI	PMV5412	CONVENTIONAL FILTER 4 EFFLUENT VALVE IN AUTO					120VAC	DI	
1756-IA16	2	DI	PMV5412	CONVENTIONAL FILTER 4 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	3	DI	PMV5412	CONVENTIONAL FILTER 4 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	4	DI	PMV5414	CONVENTIONAL FILTER 4 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	5	DI	PMV5414	CONVENTIONAL FILTER 4 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	6	DI	PMV5414	CONVENTIONAL FILTER 4 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	7	DI	PMV5415	CONVENTIONAL FILTER 4 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	8	DI	PMV5415	CONVENTIONAL FILTER 4 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	9	DI	PMV5415	CONVENTIONAL FILTER 4 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	10	DI	PCV5416	CONVENTIONAL FILTER 4 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	11	DI	PCV5416	CONVENTIONAL FILTER 4 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	12	DI	PCV5416	CONVENTIONAL FILTER 4 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	13	DI	PCV5417	CONVENTIONAL FILTER 4 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	14	DI	PCV5417	CONVENTIONAL FILTER 4 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	15	DI	PCV5417	CONVENTIONAL FILTER 4 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
RACK 0	0	DI		WIRED SPARE					120VAC	DI	
SLOT 7	1	DI		WIRED SPARE					120VAC	DI	
1756-IA16	2	DI		WIRED SPARE					120VAC	DI	
	3	DI		WIRED SPARE					120VAC	DI	
	4	DI		WIRED SPARE					120VAC	DI	
	5	DI		WIRED SPARE					120VAC	DI	
	6	DI		WIRED SPARE					120VAC	DI	
	7	DI		WIRED SPARE					120VAC	DI	
	8	DI		WIRED SPARE					120VAC	DI	
	9	DI		WIRED SPARE					120VAC	DI	
	10	DI		WIRED SPARE					120VAC	DI	
	11	DI		WIRED SPARE					120VAC	DI	
	12	DI		WIRED SPARE					120VAC	DI	
	13	DI		WIRED SPARE					120VAC	DI	
	14	DI		WIRED SPARE					120VAC	DI	
	15	DI		WIRED SPARE					120VAC	DI	
RACK 0	0	DO	PCV5111	CONVENTIONAL FILTER 1 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
SLOT 8	1	DO		WIRED SPARE					RELAY	DO	
1756-OW16I	2	DO	PCV5116	CONVENTIONAL FILTER 1 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	3	DO	PCV5117	CONVENTIONAL FILTER 1 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	4	DO	PCV5211	CONVENTIONAL FILTER 2 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	5	DO		WIRED SPARE					RELAY	DO	
	6	DO	PCV5216	CONVENTIONAL FILTER 2 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	7	DO	PCV5217	CONVENTIONAL FILTER 2 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	8	DO	PCV5311	CONVENTIONAL FILTER 3 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	9	DO		WIRED SPARE					RELAY	DO	
	10	DO	PCV5316	CONVENTIONAL FILTER 3 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	11	DO	PCV5317	CONVENTIONAL FILTER 3 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	12	DO	PCV5411	CONVENTIONAL FILTER 4 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	13	DO		WIRED SPARE					RELAY	DO	
	14	DO	PCV5416	CONVENTIONAL FILTER 4 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	15	DO	PCV5417	CONVENTIONAL FILTER 4 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
RACK 0	0	DO		WIRED SPARE					RELAY	DO	
SLOT 9	1	DO		WIRED SPARE					RELAY	DO	
1756-OW16I	2	DO		WIRED SPARE					RELAY	DO	
	3	DO		WIRED SPARE					RELAY	DO	
	4	DO		WIRED SPARE					RELAY	DO	
	5	DO		WIRED SPARE					RELAY	DO	
	6	DO		WIRED SPARE					RELAY	DO	
	7	DO		WIRED SPARE					RELAY	DO	
	8	DO		WIRED SPARE					RELAY	DO	
	9	DO		WIRED SPARE					RELAY	DO	
	10	DO		WIRED SPARE					RELAY	DO	
	11	DO		WIRED SPARE					RELAY	DO	
	12	DO		WIRED SPARE					RELAY	DO	
	13	DO		WIRED SPARE					RELAY	DO	
	14	DO		WIRED SPARE					RELAY	DO	
	15	DO		WIRED SPARE					RELAY	DO	

1 EC13 **FILTER CONTROL PANEL FCP-01 PLC IO DETAIL**

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Damon M. Chmela

TYPED NAME: DAMON M. CHMELA
MAY 18, 2011 REG. NO. 26167

NO.	DATE	REVISION	APPROVED
1	5-11-11	REVISIONS PER ADD. No. 1	DMC
2	5-18-11	REVISIONS PER ADD. No. 2	DMC

ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

FILTER CONTROL PANEL 1 - (FCP-01) PLC IO DETAIL

FAIRMONT PROJECT # WTF2008-03
DRAWING TYPE ADDENDUM
TECHNICIAN DGH
CHECKED / APPROVED AHD/DMC
DATE MAY 2011
PROJECT NUMBER P05194-2008-00
SHEET 1 of 4

EC13

Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
File: K:\Fairmont\P05194-2008-00 WTP Design\040 Final Design\AutoCAD\Drawings\07-I&C\Addendum No.2\FCP-01.dwg
Plotted: By: Peter Manfredini Date: Wednesday, May 18, 2011
Last Saved: By: Peter Manfredini Date: Wednesday, May 18, 2011 3:04:11 PM
Created: By: ---- Date: Wednesday, May 18, 2011

Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0	0	AI	LIT5100	CONVENTIONAL FILTER 1 LEVEL					4-20mA	AI	
SLOT 10	1	AI	DPT5103	CONVENTIONAL FILTER 1 DIFFERENTIAL PRESSURE					4-20mA	AI	
1756-IF8H	2	AI	AIT5104	CONVENTIONAL FILTER 1 TURBIDITY					4-20mA	AI	
	3	AI	FIT5105	CONVENTIONAL FILTER 1 EFFLUENT FLOW					4-20mA	AI	
	4	AI	PMV5112	CONVENTIONAL FILTER 1 EFFLUENT VALVE POSITION FEEDBACK					4-20mA	AI	
	5	AI	PMV5115	CONVENTIONAL FILTER 1 AIRWASH INLET VALVE POSITION FEEDBACK					4-20mA	AI	
	6	AI	LIT5200	CONVENTIONAL FILTER 2 LEVEL					4-20mA	AI	
	7	AI	DPT5203	CONVENTIONAL FILTER 2 DIFFERENTIAL PRESSURE					4-20mA	AI	
RACK 0	0	AI	AIT5204	CONVENTIONAL FILTER 2 TURBIDITY					4-20mA	AI	
SLOT 11	1	AI	FIT5205	CONVENTIONAL FILTER 2 EFFLUENT FLOW					4-20mA	AI	
1756-IF8H	2	AI	PMV5212	CONVENTIONAL FILTER 2 EFFLUENT VALVE POSITION FEEDBACK					4-20mA	AI	
	3	AI	PMV5215	CONVENTIONAL FILTER 2 AIRWASH INLET VALVE POSITION FEEDBACK					4-20mA	AI	
	4	AI	LIT5300	CONVENTIONAL FILTER 3 LEVEL					4-20mA	AI	
	5	AI	DPT5303	CONVENTIONAL FILTER 3 DIFFERENTIAL PRESSURE					4-20mA	AI	
	6	AI	AIT5304	CONVENTIONAL FILTER 3 TURBIDITY					4-20mA	AI	
	7	AI	FIT5305	CONVENTIONAL FILTER 3 EFFLUENT FLOW					4-20mA	AI	
RACK 0	0	AI	PMV5312	CONVENTIONAL FILTER 3 EFFLUENT VALVE POSITION FEEDBACK					4-20mA	AI	
SLOT 12	1	AI	PMV5315	CONVENTIONAL FILTER 3 AIRWASH INLET VALVE POSITION FEEDBACK					4-20mA	AI	
1756-IF8H	2	AI	LIT5400	CONVENTIONAL FILTER 4 LEVEL					4-20mA	AI	
	3	AI	DPT5403	CONVENTIONAL FILTER 4 DIFFERENTIAL PRESSURE					4-20mA	AI	
	4	AI	AIT5404	CONVENTIONAL FILTER 4 TURBIDITY					4-20mA	AI	
	5	AI	FIT5405	CONVENTIONAL FILTER 4 EFFLUENT FLOW					4-20mA	AI	
	6	AI	PMV5412	CONVENTIONAL FILTER 4 EFFLUENT VALVE POSITION FEEDBACK					4-20mA	AI	
	7	AI	PMV5415	CONVENTIONAL FILTER 4 AIRWASH INLET VALVE POSITION FEEDBACK					4-20mA	AI	
RACK 0	0	AI	AIT5935	COMBINED CONVENTIONAL EFFLUENT TURBIDITY					4-20mA	AI	
SLOT 13	1	AI	PMV5114	CONVENTIONAL FILTER 1 FILTER TO WASTE VALVE POSITION FEEDBACK					4-20mA	AI	
1756-IF8H	2	AI	PMV5214	CONVENTIONAL FILTER 2 FILTER TO WASTE VALVE POSITION FEEDBACK					4-20mA	AI	
	3	AI	PMV5314	CONVENTIONAL FILTER 3 FILTER TO WASTE VALVE POSITION FEEDBACK					4-20mA	AI	
	4	AI	PMV5414	CONVENTIONAL FILTER 4 FILTER TO WASTE VALVE POSITION FEEDBACK					4-20mA	AI	
	5	AI		WIRED SPARE					4-20mA	AI	
	6	AI		WIRED SPARE					4-20mA	AI	
	7	AI		WIRED SPARE					4-20mA	AI	
RACK 0	0	AO	PMV5112	CONVENTIONAL FILTER 1 EFFLUENT VALVE POSITION COMMAND					4-20mA	AO	
SLOT 14	1	AO	PMV5115	CONVENTIONAL FILTER 1 AIRWASH INLET VALVE POSITION COMMAND					4-20mA	AO	
1756-OF8	2	AO	PMV5212	CONVENTIONAL FILTER 2 EFFLUENT VALVE POSITION COMMAND					4-20mA	AO	
	3	AO	PMV5215	CONVENTIONAL FILTER 2 AIRWASH INLET VALVE POSITION COMMAND					4-20mA	AO	
	4	AO	PMV5312	CONVENTIONAL FILTER 3 EFFLUENT VALVE POSITION COMMAND					4-20mA	AO	
	5	AO	PMV5315	CONVENTIONAL FILTER 3 AIRWASH INLET VALVE POSITION COMMAND					4-20mA	AO	
	6	AO	PMV5412	CONVENTIONAL FILTER 4 EFFLUENT VALVE POSITION COMMAND					4-20mA	AO	
	7	AO	PMV5415	CONVENTIONAL FILTER 4 AIRWASH INLET VALVE POSITION COMMAND					4-20mA	AO	
RACK 0	0	AO	PMV5114	CONVENTIONAL FILTER 1 FILTER TO WASTE VALVE POSITION COMMAND					4-20mA	AO	
SLOT 15	1	AO	PMV5214	CONVENTIONAL FILTER 2 FILTER TO WASTE VALVE POSITION COMMAND					4-20mA	AO	
1756-OF8	2	AO	PMV5314	CONVENTIONAL FILTER 3 FILTER TO WASTE VALVE POSITION COMMAND					4-20mA	AO	
	3	AO	PMV5414	CONVENTIONAL FILTER 4 FILTER TO WASTE VALVE POSITION COMMAND					4-20mA	AO	
	4	AO		WIRED SPARE					4-20mA	AO	
	5	AO		WIRED SPARE					4-20mA	AO	
	6	AO		WIRED SPARE					4-20mA	AO	
	7	AO		WIRED SPARE					4-20mA	AO	
RACK 0				SLOT FILLER							
SLOT 16											
1756-N2											

1 EC14 **FILTER CONTROL PANEL FCP-01 PLC IO DETAIL (CONT.)**

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Damon M. Chmiela

TYPED NAME: DAMON M. CHMIELA
MAY 18, 2011 REG. NO. 26167

NO.	DATE	REVISION	APPROVED
1	5-11-11	REVISIONS PER ADD. No. 1	DMC
2	5-18-11	REVISIONS PER ADD. No. 2	DMC

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

FILTER CONTROL PANEL 1 - (FCP-01) PLC IO DETAIL (CONT.)

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	ADDENDUM
TECHNICIAN	DGH
CHECKED / APPROVED	AHD/DMC
DATE	MAY 2011
PROJECT NUMBER	P05194-2008-00
SHEET	2 of 4

EC14

Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
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Created: By: ---- Date: Wednesday, May 18, 2011

Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0				SLOT FILLER							
SLOT 0											
1756-N2											
RACK 0				COMMUNICATIONS MODULE							
SLOT 1											
1756-ENET											
RACK 0	0	DI	LLF5501	GAC FILTER 1 LOW LEVEL FLOAT		ALARM	NORMAL		120VAC	DI	
SLOT 2	1	DI	HLF5502	GAC FILTER 1 HIGH LEVEL FLOAT		NORMAL	ALARM		120VAC	DI	
1756-IA16	2	DI	PCV5511	GAC FILTER 1 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	3	DI	PCV5511	GAC FILTER 1 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	4	DI	PCV5511	GAC FILTER 1 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	5	DI	PMV5512	GAC FILTER 1 EFFLUENT VALVE IN AUTO					120VAC	DI	
	6	DI	PMV5512	GAC FILTER 1 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	7	DI	PMV5512	GAC FILTER 1 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	8	DI	PMV5514	GAC FILTER 1 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	9	DI	PMV5514	GAC FILTER 1 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	10	DI	PMV5514	GAC FILTER 1 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	11	DI	PMV5515	GAC FILTER 1 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	12	DI	PMV5515	GAC FILTER 1 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	13	DI	PMV5515	GAC FILTER 1 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	14	DI	PCV5516	GAC FILTER 1 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	15	DI	PCV5516	GAC FILTER 1 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
RACK 0	0	DI	PCV5516	GAC FILTER 1 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
SLOT 3	1	DI	PCV5517	GAC FILTER 1 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
1756-IA16	2	DI	PCV5517	GAC FILTER 1 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	3	DI	PCV5517	GAC FILTER 1 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	4	DI	LLF5601	GAC FILTER 2 LOW LEVEL FLOAT					120VAC	DI	
	5	DI	HLF5602	GAC FILTER 2 HIGH LEVEL FLOAT					120VAC	DI	
	6	DI	PCV5611	GAC FILTER 2 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	7	DI	PCV5611	GAC FILTER 2 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	8	DI	PCV5611	GAC FILTER 2 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	9	DI	PMV5612	GAC FILTER 2 EFFLUENT VALVE IN AUTO					120VAC	DI	
	10	DI	PMV5612	GAC FILTER 2 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	11	DI	PMV5612	GAC FILTER 2 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	12	DI	PMV5614	GAC FILTER 2 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	13	DI	PMV5614	GAC FILTER 2 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	14	DI	PMV5614	GAC FILTER 2 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	15	DI	PMV5615	GAC FILTER 2 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
RACK 0	0	DI	PMV5615	GAC FILTER 2 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
SLOT 4	1	DI	PMV5615	GAC FILTER 2 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
1756-IA16	2	DI	PCV5616	GAC FILTER 2 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	3	DI	PCV5616	GAC FILTER 2 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	4	DI	PCV5616	GAC FILTER 2 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	5	DI	PCV5617	GAC FILTER 2 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	6	DI	PCV5617	GAC FILTER 2 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	7	DI	PCV5617	GAC FILTER 2 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	8	DI	LLF5701	GAC FILTER 3 LOW LEVEL FLOAT					120VAC	DI	
	9	DI	HLF5702	GAC FILTER 3 HIGH LEVEL FLOAT					120VAC	DI	
	10	DI	PCV5711	GAC FILTER 3 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	11	DI	PCV5711	GAC FILTER 3 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
	12	DI	PCV5711	GAC FILTER 3 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
	13	DI	PMV5712	GAC FILTER 3 EFFLUENT VALVE IN AUTO					120VAC	DI	
	14	DI	PMV5712	GAC FILTER 3 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	15	DI	PMV5712	GAC FILTER 3 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	

Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0	0	DI	PMV5714	GAC FILTER 3 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
SLOT 5	1	DI	PMV5714	GAC FILTER 3 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
1756-IA16	2	DI	PMV5714	GAC FILTER 3 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	3	DI	PMV5715	GAC FILTER 3 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	4	DI	PMV5715	GAC FILTER 3 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	5	DI	PMV5715	GAC FILTER 3 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	6	DI	PCV5716	GAC FILTER 3 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	7	DI	PCV5716	GAC FILTER 3 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	8	DI	PCV5716	GAC FILTER 3 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	9	DI	PCV5717	GAC FILTER 3 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	10	DI	PCV5717	GAC FILTER 3 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	11	DI	PCV5717	GAC FILTER 3 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	12	DI	LLF5801	GAC FILTER 4 LOW LEVEL FLOAT					120VAC	DI	
	13	DI	HLF5802	GAC FILTER 4 HIGH LEVEL FLOAT					120VAC	DI	
	14	DI	PCV5811	GAC FILTER 4 RAW WATER INLET VALVE IN AUTO					120VAC	DI	
	15	DI	PCV5811	GAC FILTER 4 RAW WATER INLET VALVE FULLY OPENED					120VAC	DI	
RACK 0	0	DI	PCV5811	GAC FILTER 4 RAW WATER INLET VALVE FULLY CLOSED					120VAC	DI	
SLOT 6	1	DI	PMV5812	GAC FILTER 4 EFFLUENT VALVE IN AUTO					120VAC	DI	
1756-IA16	2	DI	PMV5812	GAC FILTER 4 EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	3	DI	PMV5812	GAC FILTER 4 EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
	4	DI	PMV5814	GAC FILTER 4 FILTER TO WASTE VALVE IN AUTO					120VAC	DI	
	5	DI	PMV5814	GAC FILTER 4 FILTER TO WASTE VALVE FULLY OPENED					120VAC	DI	
	6	DI	PMV5814	GAC FILTER 4 FILTER TO WASTE VALVE FULLY CLOSED					120VAC	DI	
	7	DI	PMV5815	GAC FILTER 4 AIRWASH INLET VALVE IN AUTO					120VAC	DI	
	8	DI	PMV5815	GAC FILTER 4 AIRWASH INLET VALVE FULLY OPENED					120VAC	DI	
	9	DI	PMV5815	GAC FILTER 4 AIRWASH INLET VALVE FULLY CLOSED					120VAC	DI	
	10	DI	PCV5816	GAC FILTER 4 BACKWASH SUPPLY VALVE IN AUTO					120VAC	DI	
	11	DI	PCV5816	GAC FILTER 4 BACKWASH SUPPLY VALVE FULLY OPENED					120VAC	DI	
	12	DI	PCV5816	GAC FILTER 4 BACKWASH SUPPLY VALVE FULLY CLOSED					120VAC	DI	
	13	DI	PCV5817	GAC FILTER 4 BACKWASH EFFLUENT VALVE IN AUTO					120VAC	DI	
	14	DI	PCV5817	GAC FILTER 4 BACKWASH EFFLUENT VALVE FULLY OPENED					120VAC	DI	
	15	DI	PCV5817	GAC FILTER 4 BACKWASH EFFLUENT VALVE FULLY CLOSED					120VAC	DI	
RACK 0	0	DI		WIRED SPARE					120VAC	DI	
SLOT 7	1	DI		WIRED SPARE					120VAC	DI	
1756-IA16	2	DI		WIRED SPARE					120VAC	DI	
	3	DI		WIRED SPARE					120VAC	DI	
	4	DI		WIRED SPARE					120VAC	DI	
	5	DI		WIRED SPARE					120VAC	DI	
	6	DI		WIRED SPARE					120VAC	DI	
	7	DI		WIRED SPARE					120VAC	DI	
	8	DI		WIRED SPARE					120VAC	DI	
	9	DI		WIRED SPARE					120VAC	DI	
	10	DI		WIRED SPARE					120VAC	DI	
	11	DI		WIRED SPARE					120VAC	DI	
	12	DI		WIRED SPARE					120VAC	DI	
	13	DI		WIRED SPARE					120VAC	DI	
	14	DI		WIRED SPARE					120VAC	DI	
	15	DI		WIRED SPARE					120VAC	DI	
RACK 0	0	DO	PCV5511	GAC FILTER 1 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
SLOT 8	1	DO		WIRED SPARE					RELAY	DO	
1756-OW16I	2	DO	PCV5516	GAC FILTER 1 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	3	DO	PCV5517	GAC FILTER 1 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	4	DO	PCV5611	GAC FILTER 2 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	5	DO		WIRED SPARE					RELAY	DO	
	6	DO	PCV5616	GAC FILTER 2 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	7	DO	PCV5617	GAC FILTER 2 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	8	DO	PCV5711	GAC FILTER 3 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	9	DO		WIRED SPARE					RELAY	DO	
	10	DO	PCV5716	GAC FILTER 3 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	11	DO	PCV5717	GAC FILTER 3 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	
	12	DO	PCV5811	GAC FILTER 4 RAW WATER INLET VALVE OPEN COMMAND					RELAY	DO	
	13	DO		WIRED SPARE					RELAY	DO	
	14	DO	PCV5816	GAC FILTER 4 BACKWASH SUPPLY VALVE OPEN COMMAND					RELAY	DO	
	15	DO	PCV5817	GAC FILTER 4 BACKWASH EFFLUENT VALVE OPEN COMMAND					RELAY	DO	

FILTER CONTROL PANEL
FCP-02 PLC IO DETAIL
1 / EC17

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Damon M. Chmela

TYPED NAME: DAMON M. CHMELA
MAY 18, 2011 REG. NO. 26167

NO.	DATE	REVISION	APPROVED
1	5-11-11	REVISIONS PER ADD. No. 1	DMC
2	5-18-11	REVISIONS PER ADD. No. 2	DMC

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

FILTER CONTROL PANEL 2 - (FCP-02) PLC IO DETAIL

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	ADDENDUM
TECHNICIAN	DGH
CHECKED / APPROVED	AHD/DMC
DATE	MAY 2011
PROJECT NUMBER	P05194-2008-00
SHEET	3 of 4

EC17

Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
File: K:\Fairmont\P05194-2008-00 WTP Design\040 Final Design\AutoCAD\Drawings\07-I&C\Addendum No.2\FCP-02.dwg
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Rack / Slot	Point	Type		Description	Terminal	EGU Lo	EGU Hi	EGU Tag	Signal	Signal Type	Dwg Sheet
RACK 0	0	DO		WIRED SPARE					RELAY	DO	
SLOT 9	1	DO		WIRED SPARE					RELAY	DO	
1756-OW16I	2	DO		WIRED SPARE					RELAY	DO	
	3	DO		WIRED SPARE					RELAY	DO	
	4	DO		WIRED SPARE					RELAY	DO	
	5	DO		WIRED SPARE					RELAY	DO	
	6	DO		WIRED SPARE					RELAY	DO	
	7	DO		WIRED SPARE					RELAY	DO	
	8	DO		WIRED SPARE					RELAY	DO	
	9	DO		WIRED SPARE					RELAY	DO	
	10	DO		WIRED SPARE					RELAY	DO	
	11	DO		WIRED SPARE					RELAY	DO	
	12	DO		WIRED SPARE					RELAY	DO	
	13	DO		WIRED SPARE					RELAY	DO	
	14	DO		WIRED SPARE					RELAY	DO	
	15	DO		WIRED SPARE					RELAY	DO	
RACK 0	0	AI		LIT5500	GAC FILTER 1 LEVEL				4-20mA	AI	
SLOT 10	1	AI		DPT5503	GAC FILTER 1 DIFFERENTIAL PRESSURE				4-20mA	AI	
1756-IF8H	2	AI		FIT5505	GAC FILTER 1 EFFLUENT FLOW				4-20mA	AI	
	3	AI		PMV5512	GAC FILTER 1 EFFLUENT VALVE POSITION FEEDBACK				4-20mA	AI	
	4	AI		PMV5515	GAC FILTER 1 AIRWASH INLET VALVE POSITION FEEDBACK				4-20mA	AI	
	5	AI		PIT5520	GAC FILTER 1 BACKWASH PRESSURE				4-20mA	AI	
	6	AI			WIRED SPARE				4-20mA	AI	
	7	AI		LIT5600	GAC FILTER 2 LEVEL				4-20mA	AI	
RACK 0	0	AI		DPT5603	GAC FILTER 2 DIFFERENTIAL PRESSURE				4-20mA	AI	
SLOT 11	1	AI		FIT5605	GAC FILTER 2 EFFLUENT FLOW				4-20mA	AI	
1756-IF8H	2	AI		PMV5612	GAC FILTER 2 EFFLUENT VALVE POSITION FEEDBACK				4-20mA	AI	
	3	AI		PMV5615	GAC FILTER 2 AIRWASH INLET VALVE POSITION FEEDBACK				4-20mA	AI	
	4	AI		PIT5620	GAC FILTER 2 BACKWASH PRESSURE				4-20mA	AI	
	5	AI		LIT5700	GAC FILTER 3 LEVEL				4-20mA	AI	
	6	AI		DPT5703	GAC FILTER 3 DIFFERENTIAL PRESSURE				4-20mA	AI	
	7	AI		FIT5705	GAC FILTER 3 EFFLUENT FLOW				4-20mA	AI	
RACK 0	0	AI		PMV5712	GAC FILTER 3 EFFLUENT VALVE POSITION FEEDBACK				4-20mA	AI	
SLOT 12	1	AI		PMV5715	GAC FILTER 3 AIRWASH INLET VALVE POSITION FEEDBACK				4-20mA	AI	
1756-IF8H	2	AI		PIT5720	GAC FILTER 3 BACKWASH PRESSURE				4-20mA	AI	
	3	AI		LIT5800	GAC FILTER 4 LEVEL				4-20mA	AI	
	4	AI		DPT5803	GAC FILTER 4 DIFFERENTIAL PRESSURE				4-20mA	AI	
	5	AI		FIT5805	GAC FILTER 4 EFFLUENT FLOW				4-20mA	AI	
	6	AI		PMV5812	GAC FILTER 4 EFFLUENT VALVE POSITION FEEDBACK				4-20mA	AI	
	7	AI		PMV5815	GAC FILTER 4 AIRWASH INLET VALVE POSITION FEEDBACK				4-20mA	AI	
RACK 0	0	AI		PIT5820	GAC FILTER 4 BACKWASH PRESSURE				4-20mA	AI	
SLOT 13	1	AI		AIT5945	COMBINED GAC EFFLUENT TURBIDITY				4-20mA	AI	
1756-IF8H	2	AI		PMV5514	GAC FILTER 1 FILTER TO WASTE VALVE POSITION FEEDBACK				4-20mA	AI	
	3	AI		PMV5614	GAC FILTER 2 FILTER TO WASTE VALVE POSITION FEEDBACK				4-20mA	AI	
	4	AI		PMV5714	GAC FILTER 3 FILTER TO WASTE VALVE POSITION FEEDBACK				4-20mA	AI	
	5	AI		PMV5814	GAC FILTER 4 FILTER TO WASTE VALVE POSITION FEEDBACK				4-20mA	AI	
	6	AI			WIRED SPARE				4-20mA	AI	
	7	AI			WIRED SPARE				4-20mA	AI	
RACK 0	0	AO		PMV5512	GAC FILTER 1 EFFLUENT VALVE POSITION COMMAND				4-20mA	AO	
SLOT 14	1	AO		PMV5515	GAC FILTER 1 AIRWASH INLET VALVE POSITION COMMAND				4-20mA	AO	
1756-OF8	2	AO		PMV5612	GAC FILTER 2 EFFLUENT VALVE POSITION COMMAND				4-20mA	AO	
	3	AO		PMV5615	GAC FILTER 2 AIRWASH INLET VALVE POSITION COMMAND				4-20mA	AO	
	4	AO		PMV5712	GAC FILTER 3 EFFLUENT VALVE POSITION COMMAND				4-20mA	AO	
	5	AO		PMV5715	GAC FILTER 3 AIRWASH INLET VALVE POSITION COMMAND				4-20mA	AO	
	6	AO		PMV5812	GAC FILTER 4 EFFLUENT VALVE POSITION COMMAND				4-20mA	AO	
	7	AO		PMV5815	GAC FILTER 4 AIRWASH INLET VALVE POSITION COMMAND				4-20mA	AO	
RACK 0	0	AO		PMV5514	GAC FILTER 1 FILTER TO WASTE VALVE POSITION COMMAND				4-20mA	AO	
SLOT 15	1	AO		PMV5614	GAC FILTER 2 FILTER TO WASTE VALVE POSITION COMMAND				4-20mA	AO	
1756-OF8	2	AO		PMV5714	GAC FILTER 3 FILTER TO WASTE VALVE POSITION COMMAND				4-20mA	AO	
	3	AO		PMV5814	GAC FILTER 4 FILTER TO WASTE VALVE POSITION COMMAND				4-20mA	AO	
	4	AO			WIRED SPARE				4-20mA	AO	
	5	AO			WIRED SPARE				4-20mA	AO	
	6	AO			WIRED SPARE				4-20mA	AO	
	7	AO			WIRED SPARE				4-20mA	AO	
RACK 0				SLOT FILLER							
SLOT 16											
1756-N2											

FILTER CONTROL PANEL
FCP-02 PLC IO DETAIL (CONT.)

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE: Damon M. Chmiela

TYPED NAME: DAMON M. CHMIELA
DATE: MAY 18, 2011
REG. NO. 26167

NO.	DATE	REVISION	APPROVED
1	5-11-11	REVISIONS PER ADD. No. 1	DMC
2	5-18-11	REVISIONS PER ADD. No. 2	DMC

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ADDENDUM

FAIRMONT WATER TREATMENT PLANT
CITY OF FAIRMONT, MINNESOTA

FILTER CONTROL PANEL 2 - (FCP-02) PLC IO DETAIL (CONT.)

FAIRMONT PROJECT #	WTF2008-03
DRAWING TYPE	ADDENDUM
TECHNICIAN	DGH
CHECKED / APPROVED	AHD/DMC
DATE	MAY 2011
PROJECT NUMBER	P05194-2008-00
SHEET	4 of 4

EC18

Autodesk Map 3D 2011
AE2S Project No.: P05194-2008-00
File: K:\Fairmont\P05194-2008-00 WTP Design\040 Final Design\AutoCAD\Drawings\07-I&C\Addendum No.2\FCP-02.dwg
Plotted: By: Peter Monfredini Date: Wednesday, May 18, 2011
Last Saved: By: Peter Monfredini Date: Wednesday, May 18, 2011 2:51:29 PM
Created: By: ---- Date: Wednesday, May 18, 2011